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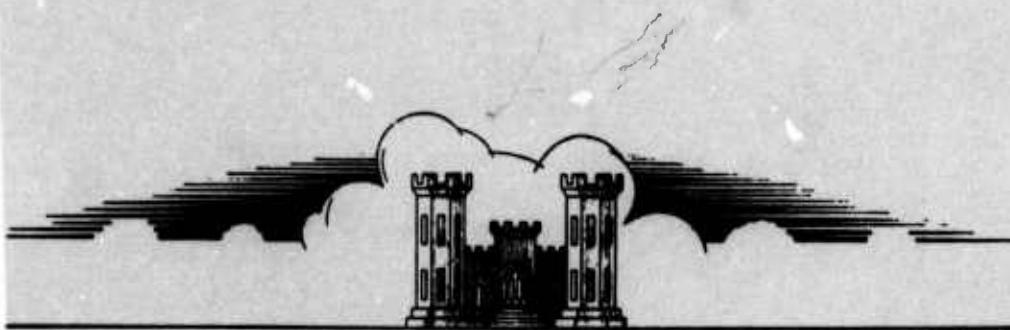
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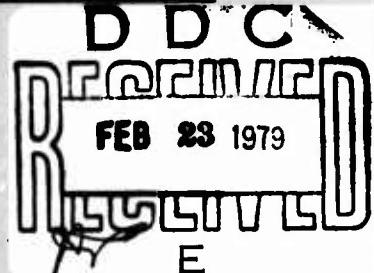
**JEROME PARK RESERVOIR DAM
BRONX COUNTY, NEW YORK**

NY 64

**PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM**



Prepared by
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DACW51-78-C-0035

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For

**DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10007**

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LOWER HUDSON RIVER WATERSHED
BRONX COUNTY, NEW YORK

JEROME PARK RESERVOIR DAM
CITY OF NEW YORK, NEW YORK
BUREAU OF WATER SUPPLY
NDS # NY 64
NYSDEC # 135 LH

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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For

DEPARTMENT OF THE ARMY
New York District, Corps of Engineers
26 Federal Plaza
New York, New York 10007

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5 September 1978

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PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

BRIEF ASSESSMENT OF GENERAL CONDITION
AND
RECOMMENDED ACTION

Name of Dam: Jerome Park Reservoir Dam

Owner: City of New York, New York

State Located: New York

County Located: Bronx

Stream: New Croton Aqueduct

Date of Inspection: 1 August 1978

Inspection Team: Converse Ward Davis Dixon
91 Roseland Avenue, P. O. Box 91
Caldwell, New Jersey 07006

and

Lev Zetlin and Associates, Inc.
95 Madison Avenue
New York, New York 10016

Based on our visual inspection of the system and a review of the design drawings, the Jerome Park Reservoir Dam is judged to be in generally good condition structurally and functioning satisfactorily at this time. Because the reservoir has a large excess storage capacity and virtually no watershed of its own, and because of the control that can be exercised on inflow from the New Croton Aqueduct and outflow to the New York City water supply system, the usual screening guidelines established by the Department of Army, Office of Chief of Engineers (OCE) for rating spillway adequacy were not used. Instead, computations performed as part of this study show that there is no danger of overtopping of the dam and that the waste weir is adequate to handle even the most severe possible local storms, provided the reservoir is isolated from the supply system.

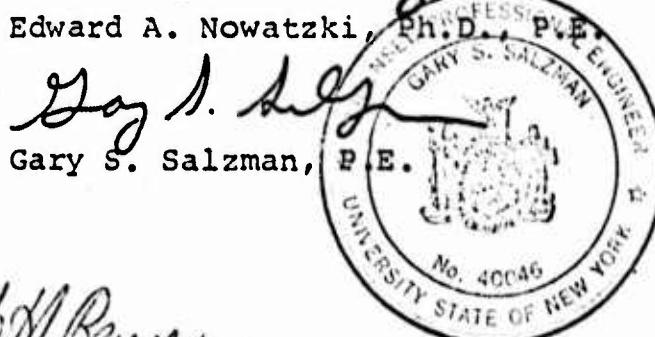
Our assessment of the general physical condition of the Jerome Park Reservoir Dam has led us to make the following recommendations which should be implemented as soon as practicable, preferably within the next three years:

1. The "lock dogs" observed to be missing on the five gate stems controlling flow to the south portal inlet in Gate House No. 5 should be replaced.
2. Loose or missing bricks on vandalized gate houses, and holes in the chain link fence surrounding the reservoir, should be repaired.
3. The low woody growth on the upstream face of the dam should be removed.
4. Vegetative growth in the concrete apron joints should be removed and the joints recaulked, if necessary.
5. A formal emergency warning procedure should be filed with police at the local precinct house, with the city uniform complaint number, and with the city uniform emergency number.
6. Security measures and their implementation should be re-evaluated and, if needed, a program for tighter security developed and followed.

Respectfully submitted,

CONVERSE WARD DAVIS DIXON

Edward A. Nowatzki



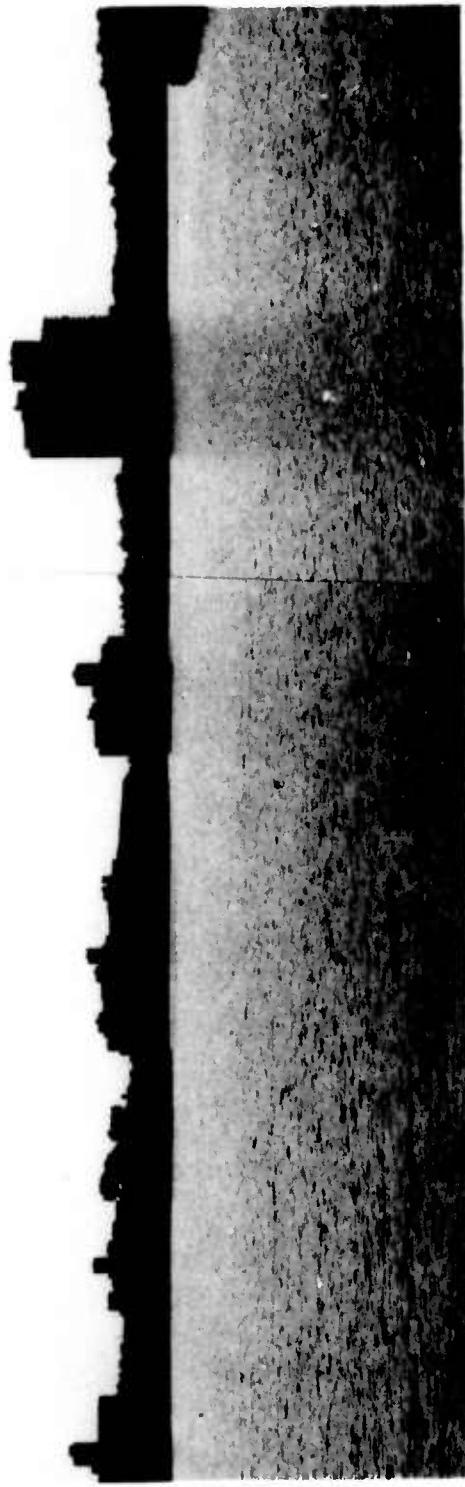
Date: 5 September 1978

Approved by:

Clark H. Benn

Colonel Clark H. Benn
New York District Engineer

Date: 27 September 1978



OVERVIEW - JEROME PARK RESERVOIR

SECTION 1
PROJECT INFORMATION

1.1 General

a. Authority

The authority to conduct this Phase I inspection and evaluation comes from the National Dam Inspection Act (P.L. 92-367) of 1972 in which the Secretary of the Army was authorized to initiate, through the Corps of Engineers, a program of safety inspections of non-federal dams throughout the United States. Management and execution of the program within the State of New York has been undertaken by the New York State Department of Environmental Conservation (NYSDEC).

393970

b. Purpose

The primary purpose of the inspection is to evaluate available data and to give an opinion as to whether the subject dam constitutes a hazard to human life or property.

1.2 Description of Project

a. Description of Dam and Appurtenances

The Jerome Park Reservoir does not impound a natural stream and has no surrounding watershed of its own. It is a receiving and water supply distribution reservoir whose level is carefully controlled. The supply comes from the Croton Reservoir in Westchester County, New York, via a branch of the New Croton Aqueduct which continues beyond the Jerome Park Reservoir and terminates at Central Park in New York City. (The Old Croton Aqueduct is no longer in use.) The dam itself is a continuous structure that extends completely around an artificially created basin. Since the terms "upstream" and "downstream" have no meaning in this context, they are redefined here for the dam structure as follows: "upstream" means facing towards the reservoir; "downstream" means facing away from the reservoir. Similarly, since "right" and "left" have no meaning in this context, they will not be used here at all and compass points will be given instead. The long dimension of the reservoir lies along an approximate north-south line, parallel to the centerline of the New Croton Aqueduct at that location.

The original design drawings show a "West Basin" and an "East Basin" separated by a dividing wall and conduits (Refer to Plate II). It should be noted that construction of the "East Basin" was abandoned in 1905 and the site is now occupied by DeWitt Clinton High School, Bronx High School of Science, Lehman College (formerly Hunter College) and train yards of the New York City Transit Authority (Refer to Plate I). The word "basin", therefore, in this report refers to the West Basin only.

Since the West Basin was artificially formed both by excavation in rock and soil and by construction of earthen embankments, there are at least six different types of structures that can be used to categorize sections through the dam (Refer to Plate II). These include approximately 1000 feet of earthfill embankment, with a concrete core wall to rock and concrete lined upstream slopes at the northern end of the reservoir. Various types of earth retaining structures compose the rest of the perimeter, approximately 10,000 feet. Design drawings show that, regardless of the type of retaining structure used at a given location, all retaining walls extend into rock.

A roadway extends around the entire dam at about the earth embankment crest elevation. The roadway is paved except for about 2800 feet along the eastern side of the dam, south of Gate House No. 5.

The maximum height of the dam at any section, as measured from top of roadway to bottom of basin, is approximately 31 feet. Reportedly, the entire basin is concrete-lined (6-inch thick), although an original design drawing (Plate III), which shows the types of finished reservoir bottom for the East Basin, indicates that the bottom need not have been lined in areas of exposed rock. Approximately 70% of the basin's foundation material is rock. Photos taken in 1966 when the reservoir was emptied for repair indicate that the entire basin is concrete-lined.

There are basically seven appurtenant structures. These are (Plate II):

- 1) Gate House No. 1, located approximately 1 mile north of the reservoir. It is "on-line" with the New Croton Aqueduct and is the control point for diverting flow into the Jerome Park Branch of the New Croton Aqueduct.

2) Gate House No. 7, located at the northeast corner of the reservoir. It is "on-line" with the Jerome Park Branch of the New Croton Aqueduct. Water is drawn from the branch aqueduct through four 4-foot wide by 5-foot high gates in the east wing of Gate House No. 7, flows through Chamber No. 12 east to Chamber No. 12 west, and then enters the reservoir through the west inlet (Refer to Plate IV).

3) Gate House No. 2, located at the north central end of the reservoir. It contains gates that tap the reservoir and feed water through two 48-inch pipes to Gate House No. 5, from which distribution to Manhattan and the East and South Bronx is made (Refer to Plate V). We were advised that Gate House No. 2 also contains gates that, when opened, would drain the reservoir into the Broadway Sewer.

4) Gate House No. 3, located on the west central side of the reservoir. It contains gates that tap the reservoir and feed the water to Gate House No. 5, similar to Gate House No. 2.

5) Gate House No. 6, located at the southeast corner of the reservoir and not at the intersection of Reservoir Avenue and Kingsbridge Road as shown in Plate II. It contains gates that tap the reservoir directly and supply water to the South and East Bronx. It also contains a Microstrainer Plant as part of the water treatment facilities at the Reservoir. At the time of the inspection, Gate House No. 6 was not in operation.

6) Gate House No. 5, located on the east central side of the reservoir at the intersection of Goulden Avenue and East 205th Street. It contains a series of gates, chambers and valves by which the entire operation of the reservoir can be controlled (Plate VI). It is the terminus of the Jerome Park Branch of the New Croton Aqueduct. Six 2-foot wide by 5-foot high gates draw water from Chamber No. 8 at the end of the aqueduct branch and direct it into the reservoir via a tunnel that inlets the reservoir approximately 2100 feet south of the gate house. This provides a second source of supply to the reservoir. Gate House No. 5 is the heart of the distribution system since flow from Gate House Nos. 2 and 3 and distribution into the supply system or back into the New Croton Aqueduct (Shaft No. 21) can be controlled from it. Chemical treatment of water is also accomplished at Gate House No. 5.

7) A waste weir located at the northwestern corner of the reservoir between Gate House Nos. 2 and 3. This waste weir consists of three spillway sections 5.25 feet wide. The spillway sections are enclosed in a shaft, and water from the reservoir accesses the spillways via three 2-foot wide by 3-foot high portals (Refer to Plate VII). There are no gates on the spillways; they empty via a drop inlet into a conduit that leads to Gate House No. 2, and then to the Broadway Sewer and the Harlem River. The invert of the access portals are approximately 11.5 feet below the spillway crests, and the invert of the sewer conduit is about 26.5 feet below the spillway crests. The elevation of the spillway crest is 135.1. (Note that 3.61 feet should be added to all elevations on design drawings shown as Plates II through XII to bring them to USGS datum.)

The "Report of a Structure Impounding Water" filed with the State of New York, Department of State Engineer and Surveyor by the Chief Engineer of the New York City Bureau of Water Supply in February 1925 (Refer to Appendix E) indicates that, in addition to the waste weir described in Section 1.2a and Plate VII, there are other waste weirs located in Gate House No. 5 and Gate House No. 2.

Plate VI shows that the two 5.25-foot wide waste weirs in Gate House No. 5 lead from the large chamber at the end of the aqueduct branch (Inlet Chamber No. 26 and Outlet Chamber No. 8 are connected by a conduit and form a single chamber) to Storage Chamber Nos. 32 and 33. Initially, these storage chambers appear to have been connected to the "East Basin", but we were apprised are not functional, and the waste weirs are not functional. Since the East Basin and Gate House No. 4 were never built, these weirs do not serve any useful function as overflow control devices today.

Plate V does not show any weir(s) in Gate House No. 2, and no mention of such an overflow device was made in our conversations with Bureau of Water Supply personnel.

b. Location

The dam is located in Bronx County, and within New York City, New York. The exact location is shown on Plate I, which is a composite taken from USGS 7.5 minute Quadrangle Sheets of Central Park, N.Y.-N.J., N $40^{\circ}45'00''$, W $73^{\circ}52'30''$, and Yonkers, N.Y.-N.J., N $40^{\circ}52'30''$, W $73^{\circ}52'30''$.

c. Size Classification

The dam is classified as "intermediate" (storage = 2380 acre-feet; height = 31 feet).

d. Hazard Classification

Because it is located in a densely populated section of New York City and adjacent to three schools, the hazard classification is "high".

e. Ownership

City of New York
Department of Water Resources
Bureau of Water Supply
Municipal Building
New York, New York 10007

f. Purpose of Dam

The dam was built to provide receiving, storage and distribution facilities for the New York City water supply system.

g. Design and Construction History

The dam was designed as part of the Croton Aqueduct System of the New York City water supply system by municipal engineers of the City of New York for the Aqueduct Commissioners. The oldest design drawings date back to 1889, with most of the original drawings completed in the early 1900s. There are over 610 design drawings on file with the City of New York Bureau of Water Supply at the Municipal Building in New York City, dating from 1889 to the present. It was virtually impossible within the time constraints of this study to review all of those drawings in detail. A list of the drawings, their abbreviated titles, and their dates and file numbers, are given in Appendix E. In our conversations with personnel of the New York City Department of Water Resources Bureau of Water Supply (NYCDWRBWS), both at the Municipal Building in Manhattan and at the dam site in the Bronx, we discovered that there are no formal computations on file with New York City that relate to the original design, construction or subsequent modifications for the Jerome Park Reservoir.

A construction history of the Croton System, complete with photographs and selected design drawings, was on file at the Bureau of Water Supply offices,

Tremont and Arthur Avenues, Bronx, New York 10457. Mr. Robert Ragucci of that office allowed us to inspect this 250+page volume entitled Report of the Aqueduct Commissioners for 1895 to 1907. It contains a detailed description and many high-quality photographs of the construction of the Jerome Park Reservoir. Plates II and IV through XI were reproduced from this book. The reservoir was put into service in 1906.

As suggested by the dates of drawings listed in Appendix E, no major modifications were made to the dam or its appurtenant structures from the time it was put in operation until 1938. At that time, the superstructures of all the gate houses were changed from wood frame to the brick construction that exists today.

In 1966, the reservoir was drained to make modifications to Gate House No. 6, to repair deteriorated sections of the concrete liner and slope cover, and to remove whatever silt had accumulated in the reservoir since its opening in 1906. There were no written records or computations relating to these repairs and modifications; information was obtained from conversations with Bureau of Water Supply personnel, photos on file at the Bronx office, and drawings on file at the Manhattan office.

h. Normal Operating Procedure

The operating procedure is quite complex and can best be understood by reference to Plates II, IV, V, VI and VIII. Ordinarily, the gates in Gate House No. 1 are always kept open to allow diversion of flow from the New Croton Aqueduct into the Jerome Park Branch. Water from the diversion aqueduct is normally not fed directly into the water supply system, but is first allowed to enter the Jerome Park Reservoir. This is accomplished at Gate House No. 7 and/or at Gate House No. 5 (Refer to Section 1.2a). Normally, the reservoir is supplied through both gate houses simultaneously.

Water is taken out of the reservoir through gates located in Gate House Nos. 2 and 3. The gates in these gate houses, leading in each case to two 48-inch diameter cast iron pipes, are ordinarily left full open. Flow proceeds through the pipes to Main Chamber No. 19 in Gate House No. 5. Flow into Main Chamber No. 19 is controlled by four gates in Gate House No. 5, two each for Inlet Chamber Nos. 16 and 17 which receive flow from Gate House Nos. 3 and 2, respectively. Water also flows from the reservoir into Main Chamber No. 19 through a drop well located just west of Gate House No. 5 and just

south of the Shaft 21 feeder conduit. Flow from the drop well enters Inlet Chamber No. 13 in Gate House No. 5 and then through two control gates into Main Chamber No. 19. Ordinarily, the gates of the drop well inlet are left open.

All distribution to the water supply system takes place from Main Chamber No. 19 in Gate House No. 5. Supply to Manhattan's Central Park Reservoir is accomplished by feeding water from Main Chamber No. 19 through four gates, two each connected to Outlet Chamber Nos. 15 and 14, into an 11-foot diameter conduit that leads to the drop inlet of Shaft No. 21 (Refer to Plate VIII). Supply to the East and South Bronx is also accomplished by feeding water from Main Chamber No. 19 through two gates into Outlet Chamber No. 22, and then through two 48-inch diameter cast iron pipes into the distribution system.

In the normal operating procedure described above, water is treated in Gate House No. 5 before its distribution into the supply system.

The operation and maintenance of all equipment in the system is performed under the direction of Mr. George Kuse, who lives nearby and is available by telephone 24 hours a day.

Inflow and outflow quantities are dictated by seasonal and diurnal demands. Flow measurements and capacity computations are made daily. (Refer to Appendix E for "Croton Delivery and Consumption" records for January through May 1978.) Records of these measurements are on file at Bureau of Water Supply offices in Manhattan.

1.3 Pertinent Data

a. Drainage Area

Not applicable; reservoir level is controlled.

b. Discharge at Damsite

Discharge is controlled. Overflow spillway capacity (assuming only the waste weir between Gate House Nos. 2 and 3) = 200 cfs.

c. Elevations (feet above MSL)

Top of dam: 140.1.

Maximum pool (top of dam): 140.1.

Normal pool (top of waste weir): 135.1.
Bottom of reservoir: 108.6.
Aqueduct invert, G.H. #7: 122.4.
Chamber #12, G.H. #7: 110.6
Invert of conduit to reservoir, G.H. #7: 111.6
Aqueduct invert, G.H. #5: 122.3.
Inlet Chamber #26, G.H. #5: 122.1.
Outlet Chamber #8, G.H. #5: 122.1.
Invert of conduit to south portal, G.H. #5:
111.1.
Main Chamber #19, G.H. #5: 110.6.
Invert of conduit to Shaft #21, G.H. #5: 97.1.
Invert of collection chamber leading to two 48"
diameter supply lines below Chamber #22, G.H.
#5: 102.1.

d. Reservoir Length

Normal pool: 4500 feet (approximate).
Maximum pool: 4500+ feet; there is about 5 feet
of freeboard and except for the embankment at
the northern end of the dam, the reservoir is
enclosed by near vertical retaining walls.

e. Storage (acre-feet)

Normal pool (spillway crest): 2380 acre-feet.
Maximum pool (top of dam): 2850 acre-feet.

f. Reservoir Surface Area (acres)

Normal pool (spillway crest): 94.
Maximum pool (top of dam): 94+ (see Section
1.3d above).

g. Dam

Type: Earthfill with core wall into rock and various types of concrete retaining structures founded in rock. Most of basin excavated in soil and rock. Retaining walls hold back virgin material and some construction backfill.

Length: 1100 feet (approximate - along perimeter roadway).

Height: Variable; 31 feet from bottom of basin to top of perimeter roadway.

Top width: Variable; approximately 45 feet at earth embankment section.

Side slopes: 1 horizontal to 4 vertical along retaining wall sections. 2-3/4 horizontal to 1 vertical on upstream embankment and 2-1/2 horizontal to 1 vertical on downstream embankment.

Core wall: Top width = 3 feet at elevation 137.1; 1 horizontal to 20 vertical upstream and downstream batter to elevation 77.1 where width = 9 feet. Constant thickness from that elevation to foundation into rock.

Retaining walls: Various sections; west and south walls have 1 horizontal to 4 vertical upstream batter and 1 horizontal to 6 vertical downstream batter (top width = 3'7"); north wall has 1 horizontal to 4 vertical upstream batter and vertical face downstream (top width = 3'3"); east wall is really a massive concrete structure that contains the Jerome Park Branch of the New Croton Aqueduct and the Old Aqueduct north of Gate House #5 (top width = 25'; bottom width = 30') and the south inlet conduit to the reservoir and the Old Aqueduct south of Gate House #5 (top width = 13.75'; bottom width = 35').

h. Diversion and Regulating Tunnels

The Jerome Park Reservoir can be completely bypassed by diverting flow at Gate House #1 from the Jerome Park Branch of the New Croton Reservoir and having it go directly into Shaft No. 21 via Shaft No. 20 (Refer to Plate II).

Flow can also be diverted from the Jerome Park Reservoir by the "Procedure to Isolate Jerome Park Reservoir from Distribution System" contained in Appendix E.

i. Spillway (Waste weir between Gate House Nos. 2 and 3)

Type: Concrete crest.

Length of weir: 3 sections 5.25 feet long separated by 1.75-foot-wide piers.

Width at crest: 2.75 feet.

Crest elevation: 135.1.

Gates: None.

Other: The spillway structure is enclosed in the retaining wall. Water from the reservoir accesses the spillway through three 2-foot wide by 3-foot high portals (invert elevation 123.6) in the upstream face of the retaining wall (Refer to Plate VII).

j. Regulating Outlets

There are at least 24 gates that can be operated to regulate flow. Refer to Section 1.2a and "Procedure to Isolate Jerome Park Reservoir from Distribution System" in Appendix E for details.

SECTION 2

ENGINEERING DATA

2.1 Design

As indicated previously, there are over 610 design drawings of the dam and its appurtenant structures dating back to 1889. These drawings contain plans, sections and structural details of the dam, each of the gate houses, the waste weir, the aqueduct, and other related items such as the chlorination equipment, the microstrainer, etc. Electrical, and plumbing and heating drawings are also available. All of these drawings are on file at the Manhattan office of the Bureau of Water Supply.

There is a large amount of engineering design data available from these drawings. Plates II through XI in this report are representative of the type of data contained in these drawings. There are, however, no structural design or hydraulic computations on file, although notes on some of the drawings indicate that the drawings are to accompany specifically numbered reports of the chief engineer. Thus, it appears that at one time such computations did exist.

The files also contain drawings showing the location plan for a large number of exploratory borings along the southern and eastern boundaries of the East Basin, a rock line profile at the southern end of the East Basin, and a crude geological cross section through the East Basin. No such data were found for the West Basin.

No information was available regarding the type of materials used in construction of embankments or in backfilling behind the retaining walls.

The only available source for hydrologic information (storage capacity, water surface area, etc.) was the Report of a Structure Impounding Water filed by the City of New York Bureau of Water Supply with the State of New York Department of State Engineer and Surveyor in February 1925 (Refer to Appendix E).

2.2 Construction

A construction history of the entire Croton System, complete with high-quality photographs and selected structural design drawings, was on file at the

Bronx office of the Bureau of Water Supply. This book, entitled Report of the Aqueduct Commissioners for 1895 to 1907, contains a chapter on the Jerome Park Reservoir. A brief perusal of this chapter and its accompanying photos showed that many of the design features were actually built as designed. For example, there is one photograph showing the embankment core wall just after its construction and prior to the construction of the embankment. From the photo, it is evident that the core wall was founded in rock, as indicated on the design drawings. The Aqueduct Commissioners' Report contains nineteen plates (Plates 94 through 113) of design drawings; nine of those plates have been reproduced and used as part of this report (Plate II and Plates IV through XI).

2.3 Operation

Operation records dating back to 1907, the year the Jerome Park Reservoir was put into service, are reportedly available at the Manhattan office of the Bureau of Water Supply. These records include the following data obtained from measurements made daily at 8 AM (storage and drafts in million gallons):

1. New Croton Aqueduct
 - a. Amount delivered to aqueduct
 - b. Amount taken by local communities
 - c. Aqueduct storage: (+) gain, (-) loss
 - d. Infiltration (assumed constant at +3.2 million gallons per day)
 - e. Amount delivered to New York City
(a - b + c + d)
2. Distribution Reservoirs
 - a. Elevation of water level at Jerome Park Reservoir
 - b. Corresponding storage
 - c. Elevation of water level at Central Park Reservoir
 - d. Corresponding storage
 - e. Total storage

- f. Gain (+) or loss (-) from previous day's total storage
- g. Inches of rain at Central Park (recorded monthly)
- h. Monthly storage from rain at Central Park (rain yield = 5 mg/in)
- i. Consumption of Croton water in New York City (le - 2f)

We were informed by Mr. Barkow of the Manhattan office that operation of the system was dictated by demand, and that under normal conditions, Croton Reservoir outflow was adjusted to keep the Jerome Park Reservoir at approximately elevation 133± (about two feet below the waste weir overflow level).

An example of data contained in these operation records is found in Appendix E for the months of January through May 1978. It is evident from these records that flow into and out of the Jerome Park Reservoir is very carefully controlled with no allowance being given to sources other than the aqueduct itself, i.e. contribution of rainfall and runoff at the damsite is negligible.

2.4 Evaluation

a. Availability

Except for the Report of a Structure Impounding Water, which was on file with NYSDEC, all data were obtained from NYCDWRBWS. The 610+ design drawings and the operation data for Jerome Park Reservoir were on file at the Manhattan office and were readily available if the potential user knew what he was looking for.

Other data, specifically relating to the day-by-day operations of the Jerome Park Reservoir, were available at the Bronx office or from conversations with the caretaker, Mr. George Kuse. All personnel interviewed by the inspection team were cooperative and very helpful.

b. Adequacy

There is a large amount of engineering design data; however, its nature is such that detailed engineering analyses could not be performed. Consequently, the assessment made here is based primarily on a general evaluation of the available data, the results

of the visual inspection, and conversations with personnel of NYCDWRBWS.

c. Validity

There is no reason to question the validity of the information contained on the available drawings or in the operations records. It must be kept in mind, however, that the East Basin shown in many of the design drawings was never completed. No detailed drawings were available to show how chamber connections, etc. were modified to account for that fact. Additionally, it must be kept in mind that the reference for elevations shown on all drawings is 3.61 feet higher than the USGS reference. Consequently, 3.61 feet must be added to all elevations to bring them to the standard reference used in this study.

2.5 Geology

a. General Geology

The Jerome Park Reservoir and Dam are located in the western part of the Borough of the Bronx, in New York City. The bedrock is the Fordham Gneiss. Although the region has been intensely glaciated, the glacial cover is marginal. There are no significant geologic structures noted.

b. Site Geology

The site is heavily urbanized. The combination of thin glacial cover, filled areas, and built-up areas has obliterated any rock outcrops. However, the literature and field observations elsewhere indicate the rock is folded.

There are no surface inlets or outlets to the reservoir, which is controlled by a subsurface aqueduct system.

c. Evaluation

There were no geologic features (stratification, faults, cavities, etc.) detected or suspected that could be expected to affect the dam or its appurtenant structures adversely.

SECTION 3

VISUAL INSPECTION

3.1 Findings

a. General

The reservoir and dam are located in a high-density, residential neighborhood of the West Bronx in New York City. We first drove the city streets around the perimeter of the dam and found that Goulden Avenue on the east and Reservoir Avenue on the south are at elevations higher than that of the reservoir. Figure 1 in Appendix D shows a Lehman College parking lot behind the eastern retaining wall of the dam. The parking lot is at the same elevation as Goulden Avenue, which borders the reservoir to the east (Refer to Plate I). Reservoir Avenue to the south rises in elevation from its intersection with Goulden Avenue and then merges with Sedgwick Avenue at the southwest corner of the reservoir. The southern side of Reservoir Avenue and the western side of Sedgwick Avenue are lined with multi-story apartment houses. As Sedgwick Avenue runs north from its intersection with Reservoir Avenue, it drops in grade so that its elevation along most of the western and northern side of the dam is below that of the reservoir (Figs. 2 and 3, Appendix D). The area immediately north of the reservoir contains many high-rise apartments, all of whose entrances are below the reservoir elevation (Refer to Overview Photo). Most of these are located on Sedgwick Avenue North and on Van Cortland Avenue, which runs steeply downhill to Van Cortland Park South (Refer to Plate II). In the event of failure, flow of water would occur to the north down Van Cortland Avenue.

As indicated previously, the area east of Goulden Avenue containing the schools and the railroad train yard was at one time the proposed "East Basin" of the reservoir. The DeWitt Clinton High School athletic field, south of the building, is approximately 20 feet below the grade of Goulden Avenue. The western retaining wall of that athletic field was inspected and found to be in generally good condition, with some minor cracks and spalls. There were weep holes in the wall, but no seepage from them or from the soil in the area of the athletic field was observed.

b. Dam

The inspection of the dam was performed by driving the perimeter roadway on the crest to various locations, and then walking the site in those areas.

In general, all earthen embankments were found to be grass covered and very well maintained (Figs. 2 and 3, Appendix D). No seepage was detected on or at the toe of the downstream slopes. A chain link fence, with barbed wire top in some areas, encircles the reservoir (Fig. 3, Appendix D). Along the western and northern portions of the perimeter, the fence is at or near the toe or toe wall of the embankment. There is a paved city street usually within 50 feet of the fence in these areas, and beyond that private residences. Consequently, no evidence of seepage beyond the toe could be observed.

The earthfill and core wall section at the northern end of the reservoir was inspected and found to be in generally good condition. No significant deterioration of the upstream concrete apron was observed; vegetative growth in some of the construction joints was noted (Fig. 4, Appendix D).

The embankment and retaining wall along the western perimeter were inspected and found to be in generally good condition. A number of small bushes were observed growing on the upstream face of the embankment along the western portion of the perimeter (Figs. 2 and 5, Appendix D). There was no evidence of seepage on the downstream slope or at the downstream toe wall.

All sections of retaining wall at the water's edge along the western, southern and eastern boundaries of the dam were of stone masonry construction and consisted of mortared, rock-faced, granite blocks with a surface-finished granite cap (Figs. 1 and 5, Appendix D). In all cases, the retaining walls were found to be in generally good condition and very well maintained.

c. Appurtenant Structures

As indicated in Section 1.2a, there are seven major appurtenant structures: Gate Houses Nos. 1, 5, 7, 2, 3, 6 and the Waste Weir between Gate House Nos. 2 and 3.

Gate House No. 1, which is located about 1 mile north of the damsite in Van Cortland Park, was not inspected since we were informed that it had been sealed shut to guard against vandalism. Although it contains

the gates that divert flow into the Jerome Park Branch of the New Croton Aqueduct, we saw no reason to have the seals broken and inspect the operating equipment. We were told that the gates were always left open to divert water towards the Jerome Park Reservoir, but that water flowing in the Jerome Park Branch of the aqueduct could be controlled at Gate House Nos. 7 and 5 and made to bypass the reservoir completely (Refer to Section 1.2h).

Inspection of Gate House No. 5 revealed that it contains all of the chlorination and flow monitoring equipment currently in use (Fig. 6, Appendix D). It also contains the gates and gate stands by which almost the entire operation of the reservoir can be controlled (Fig. 7, Appendix D). We requested that Mr. Kuse arrange to have all active and relevant gates operated. He informed us that five of the six gates that control flow to the south portal (inlet to the reservoir south of Gate House No. 5) could not be operated since the bronze "lock dogs" had been stolen. We were informed that these gates were ordinarily left in the open position and were in such a position on the day of the inspection. The one gate that was operational was raised and lowered with difficulty by two men working a long lever such as that shown on Figures 6 and 7.

The four gates controlling flow from Main Chamber No. 19 in Gate House No. 5 to Shaft No. 21 (Manhattan's water supply line) were inspected and observed to operate satisfactorily. They are driven by a portable electric motor mounted on a tripod (see Background in Fig. 7, Appendix D).

None of the other gates in Gate House No. 5 were operated since their opening or closure would not be required in the event that the reservoir needed to be lowered or in case bypass of aqueduct water was desired.

The physical condition of Gate House No. 5 was found to be generally satisfactory (Fig. 8, Appendix D). There was not much evidence of vandalism, although Mr. Kuse noted that broken windows were commonplace.

The viaduct leading from Gate House No. 5 to Shaft No. 21 was inspected and found to be in satisfactory condition (Figs. 8 and 9, Appendix D).

The next appurtenant structure to be inspected was Gate House No. 7. It was found to be in generally good condition; some of the windows had been boarded up because of vandalism. The four gates (Rodney

Hunt) in the east bay of Gate House No. 7 were operated manually by a transferable crank handle that attached to the gate stems. Operation was performed easily by one man. A concrete boat ramp just south of Gate House No. 7 was also inspected and found to be in generally good condition.

Gate House Nos. 2 and 3 were visited; however, both of these had been "sealed" in order to protect the operating equipment inside from being vandalized. Sealing of a gate house consists of bricking up the windows and welding flexible steel doors shut. Figure 10 shows Gate House No. 3 in the sealed condition. We were informed that, under normal operation, the gates in Gate House Nos. 2 and 3 are left full open to draw water from the reservoir into the two 48-inch diameter pipes that lead to Gate House No. 5. Control of this flow is accomplished by gates in Gate House No. 5, as explained previously. We were also informed that, should an emergency situation arise that required the gates in Gate House Nos. 2 and/or 3 to be shut, the gate house structures could be "unsealed" in a short time (approximately 15 minutes). This inconvenience was deemed preferable to having gate stands smashed and chamber grills displaced and thrown into chambers by vandals as had been done previously. It is apparent in Figure 10 from the missing bricks on the parapet and corner face of Gate House No. 3, that vandalism is an acute problem.

The exposed portion of the waste weir was inspected and found to be in generally good condition (Fig. 11, Appendix D). Here again, the top grill had been replaced by steel plates welded to the grill mounts because of past experience with vandalism. Water was heard flowing over the waste weir; flowing water could also be observed through joints between the steel cover plates. From field observation and from a review of the design drawings, it seemed that if the weir structure should fail, water from the reservoir would flow freely into the Broadway Sewer.

The last structure to be inspected was Gate House No. 6. It too appeared to be in generally good physical condition. The microstraining equipment inside the building had not been in use for some time and was moderately rusted. We were informed that gates in Gate House No. 6, which would allow direct flow of water from the reservoir into the South Bronx distribution system, were shut and had not been used in at least 3 years.

The roadway that extends around the perimeter of the dam at about elevation 140.1 appeared to be in generally good condition. Occasional cracks (Fig. 5, Appendix D) were observed in the paved sections of the roadway on the northern, western and southern perimeter; however, inspection of the embankment near the cracks revealed that they were not due to movement or cracking of the embankment, but were probably the result of expansion or vehicular stress. The southern portion of the perimeter roadway is unpaved (Fig. 12, Appendix D); it is easily passable, although there is tall vegetative growth on its sides (Figs. 1 and 12, Appendix D).

A small section of the chain link fence surrounding the reservoir was missing along the eastern perimeter on the day of the inspection. We were informed by NYCDWRBWS personnel that breaches such as this were commonplace and that the one observed had not been there the previous day. It became apparent during the inspection and from conversations with Messrs Ragucci and Kuse that security measures in effect at the reservoir were not totally effective. We were informed that four trespassers had drowned in the reservoir in the past two years. On the day of the inspection, joggers (trespassers) were observed within the compound (Figs. 2 and 3, Appendix D).

d. Foundation

The foundation of the Jerome Park Reservoir Dam was not visible.

e. Reservoir Area

The reservoir area is limited to the pool itself and the dam structure. The area surrounding the reservoir immediately beyond the embankments is highly urbanized so that there is virtually no local watershed. The grass on the embankments is very well maintained and in general other features of the reservoir area (fences, toe walls, sidewalks, etc.) are kept in good repair.

f. Downstream Channel

The downstream channels are the potable water supply systems for Manhattan and the South and East Bronx, and the Broadway Sewer which empties into the Harlem River. None of these structures could be observed.

g. Evaluation

The subject dam and its appurtenant structures are in generally good condition and, with continued maintenance, can be expected to function satisfactorily under normal operating conditions. There was nothing observed at the time of the inspection to indicate that the dam is unsafe. Vandalism has been a problem, but now that all of the unattended gate houses have been "sealed", it is expected that damage due to vandals will be only superficial.

SECTION 4

OPERATIONAL PROCEDURES

4.1 Procedures

Mr. George Kuse, caretaker of the Jerome Park facility, described the operational procedures to us. He indicated that major control of the inflow was accomplished at the Croton Reservoir at the head of the New Croton Aqueduct. The procedures normally followed for more precise control of inflow and outflow were described in Section 1.2h. Operators followed those procedures to increase or decrease outflow in response to demand.

Mr. Bronstein, an engineer with NYCDWRBWS, provided us with a copy of the "Procedure to Isolate Jerome Park Reservoir from Distribution System" (Refer to Appendix E). This procedure would be used if the water level in the reservoir was to be maintained and if the distribution system were to be fed directly by the aqueduct without treatment of the water.

Mr. Kuse described to us a procedure that could be used to drain the reservoir. The Jerome Park Branch of the Aqueduct would be cut off either at the Croton Reservoir or at the diversion gates in Gate House No. 1. The four gates in Gate House No. 5 controlling flow from Gate House Nos. 2 and 3 and the two gates on the drop well inlet on Gate House No. 5 would be set at full open. The aqueduct take off gates (four in Gate House No. 7 and six in Gate House No. 5) would be closed. Actually, they could be left open if the aqueduct were entirely cut off. The four gates leading to Shaft No. 21 and the two gates leading to the Bronx distribution system in Gate House No. 5 would be set at full open. If this procedure were followed, it was reported that the reservoir could be completely drained within six days.

4.2 Maintenance of Dam

The dam appears to be well maintained; grass on embankment slopes is properly trimmed. Steps are being taken to tighten security and minimize serious damage to the dam, its appurtenant structures and its operating facilities by vandalism.

4.3 Maintenance of Operating Facilities

The operating facilities are in generally good condition. The only exception noted was that the "lock dogs" on five out of six gate controls in Gate House No. 5 were missing. These gates are important in that they control flow from the aqueduct to the reservoir via the south portal.

4.4 Warning Systems in Effect

The general condition of the dam and its appurtenant structures are checked periodically as part of the normal security measures. In case of an emergency, the police reportedly would call the Bureau of Water Supply, although the local police precinct has never been formally advised to do so. If the City Complaint Department Number or emergency number (911) were called, we were advised that appropriate personnel in the Bureau of Water Supply would be called, and cognizant personnel of that agency can be reached at any time during the day or night. Mr. Kuse, the caretaker, lives nearby and would be available on a 24-hour basis.

All gates that are normally used are easily accessible. Even those gates that are in "sealed" gate houses can be reached within 15 to 20 minutes. The main control of inflow to the Jerome Park Reservoir is accomplished by electrically driven gates at the Croton Reservoir end of the New Croton Aqueduct. In case of emergency, operators of the facility at Croton can reportedly be reached by telephone or by radio from Jerome Park.

4.5 Evaluation

Maintenance of the dam and its operating facilities, except for the one exception noted above, appears to be satisfactory. The emergency alert system in effect seems to be adequate, although we were not shown a written emergency warning procedure.

SECTION 5
HYDRAULICS AND HYDROLOGY

5.1 Evaluation of Hydraulic Features

a. Design Data

The dimensions of all gates, chambers, weirs and connecting conduits are found on, or can be scaled from, Plates II through XI. A detailed drawing of a typical sluice gate and lifting apparatus is presented in Plate XII. There are no data or computations available on the hydraulic performance of any of the inlet or outlet structures. Flow computations performed as part of this study are found in Appendix C.

b. Experience Data

System inflow and outflow data are available as indicated in Section 1.2h and as presented in Appendix E.

Rating data for individual elements of the system are not available. Since inflow and outflow are carefully controlled, the concept of maximum recorded flow has little meaning.

c. Visual Observations

Under normal operating conditions, as was the case on the day of the inspection, water fills all chambers and none of the gates or inlet and outlet structures are visible. Consequently, none of the hydraulic features of the dam and its operating facilities could be observed directly.

5.2 Evaluation of Hydrologic Features

As indicated previously, the Jerome Park Reservoir is a controlled inflow and outflow reservoir that has virtually no watershed of its own. Since it can be isolated from the source of inflow, it is not in danger of being overtopped. Similarly, its waste weir is adequate to discharge an inflow of approximately 200 cfs if the reservoir is completely isolated from the distribution system. This would be more than enough to handle any runoff from the embankments. In these respects it has no hydrologic features that need to be evaluated as part of this study.

SECTION 6

STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual observations of the earthfill embankment and retaining wall/earthen back slope sections of the dam did not disclose any signs of structural instabilities or potential dangerous conditions such as seepage. The vertical and horizontal alignments of the embankment and the retaining wall sections appeared to have been maintained as evidenced by the lack of vertical and horizontal offset in the paved road around most of the perimeter. The condition of all concrete structures was generally good; there were no cracks in buildings, walls, concrete aprons, etc., to indicate foundation failure.

b. Design and Construction Data

No design computations or construction data relating directly to stability were available for review. Since no information was available regarding the nature of the embankment materials or their engineering properties, neither stability nor seepage analyses could be performed as part of this study.

A review of the design drawings and pictures taken during construction suggests that stability should not be a problem. All retaining walls are founded either in rock or in hardpan; embankments were constructed or cut at shallower than conventionally designed slopes. The earth fill section contains a concrete corewall founded in rock; construction photos show that the wall was built.

c. Operating Records

None available.

d. Post Construction Changes

No major structural changes have been made to the dam structure since its completion in 1907.

The superstructures of all gate houses were reconstructed in the 1930s and some modifications (micro-strainer installation) were made to Gate House No. 6 in the 1960s.

The reservoir was also drained and cleaned in the mid-1960s and the concrete lining and aprons repaired.

None of these post construction changes appear to have affected the stability of the dam structure in any way.

e. Seismic Stability

The Jerome Park Reservoir is nominally located in Seismic Risk Zone 1 according to the Alger-missen Seismic Risk Map. Although earthquakes that cause minor damage can be expected to occur in this zone, the design and construction practices conventionally used for small earth dams are considered to be adequate in areas of low seismicity and the safety factors used for static conditions should preclude major damage for all but the most catastrophic earthquakes. However, no computations were performed to evaluate the effect of earthquakes on the subject dam.

SECTION 7

ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Safety

Visual inspection of the system and a review of the design drawings indicate that the dam, its appurtenant structures, and its operating facilities are in generally good condition and functioning satisfactorily at this time.

Because the reservoir has a large excess storage capacity and virtually no watershed of its own, and because of the controlled nature of the inflow and outflow that enables the reservoir to be isolated from the supply and/or distribution systems, the waste weir is considered adequate to handle even the most severe local storms. (Refer to hydraulic/hydrologic computations in Appendix C.) For the same reasons, the concepts of Probable Maximum Flood (PMF) and Spillway Design Flood (SDF) do not seem applicable in this case for use as screening criteria for spillway adequacy.

b. Adequacy of Information

The information available to us was not adequate for a detailed analysis of the stability of the various dam sections. The safety assessment made above is based primarily upon visual observations of the structure on the day of the inspection and from the design drawings which indicate that the dam appears to have been designed according to conventional engineering practice (reasonable cut and fill slopes, cutoff wall in embankment, concrete liner and aprons, foundations to rock, etc.).

No hydrologic data were available; however, as indicated above, because of the nature of the dam, none were needed.

c. Urgency

Because no major deficiencies were detected in either the physical condition of the dam and its appurtenant structures or in the operations and maintenance programs, there is no urgency in performing the minor repairs recommended below.

d. Necessity for Further Investigations

There is no necessity for further investigations.

e. Recommendations and Remedial Measures

1. Alterations/Repairs

(a) "Lock dogs" should be provided; they were missing on the five gate stems controlling flow to the south portal inlet in Gate House No. 5.

(b) Loose or missing bricks on vandalized gate houses should be repaired.

(c) The low woody growth on the upstream face of the dam should be removed before its roots penetrate the embankment too deeply.

(d) Vegetative growth in the concrete apron joints should be removed and the joints recaulked, if necessary.

(e) Breaches of the chain link fence should be repaired.

The remedial work recommended above is not critical in terms of urgency. It should be done as soon as practicable, but preferably within the next three years.

2. Operations and Maintenance Programs

The operations and maintenance programs currently in effect seem to be satisfactory in general. Additional security measures are desirable to diminish the opportunity for vandalism and trespassing in general. A formal, chain-of-command, emergency warning procedure should be drawn up and presented to the police at the local precinct house, the city uniform complaint number, and the city uniform emergency number.



SCALE 1"=2000'

MAP SOURCE: BASE MAP WAS ADAPTED FROM U.S. GEOLOGICAL SURVEY MAPS,
YONKERS, N.J.-N.Y. QUADRANGLE, 1956 AND CENTRAL PARK,
N.Y.-N.J. QUADRANGLE, 1966, BOTH 7.5 MINUTE SERIES.
(BASE MAP MAY NOT REFLECT RECENT CARTOGRAPHIC CHANGES).

PLATE I SITE LOCATION MAP

**City of New York PLATE 94
THE AQUEDUCT COMMISSIONERS
JEROME PARK RESERVOIR
PLAN AND SECTIONS**

MARCH 1907.

SCALE OF PLAN.

100 FT.

100 YDS.

100 ACRES.

100 MILES.

100 FEET.

100 METERS.

100 KILOMETERS.

100 MILES.

100 FEET.

100 METERS.

100 KILOMETERS.

100 FEET.

100 METERS.

100 KILOMETERS.

CONVERSE WARD DAVIS DIXON
CONSULTING ENGINEERS
PLATE 11 SEPTEMBER 1978

CHIEF ENGR

NOTE: ELEVATIONS REFER TO CITY DATUM
WHICH IS 36 FT. ABOVE CROTON DATUM.

SECTION G-G'

SECTION E-E'

SECTION F-F'

SECTION B-B'

SECTION A-A'

SECTION C-C'

SECTION D-D'

SECTION H-H'

SECTION I-I'

SECTION J-J'

SECTION K-K'

SECTION L-L'

SECTION M-M'

SECTION N-N'

SECTION O-O'

SECTION P-P'

SECTION Q-Q'

SECTION R-R'

SECTION S-S'

SECTION T-T'

SECTION U-U'

SECTION V-V'

SECTION W-W'

SECTION X-X'

SECTION Y-Y'

SECTION Z-Z'

SECTION AA-AA'

SECTION BB-BB'

SECTION CC-CC'

SECTION DD-DD'

SECTION EE-EE'

SECTION FF-FF'

SECTION GG-GG'

SECTION HH-HH'

SECTION II-II'

SECTION JJ-JJ'

SECTION KK-KK'

SECTION LL-LL'

SECTION MM-MM'

SECTION NN-NN'

SECTION OO-OO'

SECTION PP-PP'

SECTION QQ-QQ'

SECTION RR-RR'

SECTION SS-SS'

SECTION TT-TT'

SECTION UU-UU'

SECTION VV-VV'

SECTION WW-WW'

SECTION XX-XX'

SECTION YY-YY'

SECTION ZZ-ZZ'

SECTION AA-AA'

SECTION BB-BB'

SECTION CC-CC'

SECTION DD-DD'

SECTION EE-EE'

SECTION FF-FF'

SECTION GG-GG'

SECTION HH-HH'

SECTION II-II'

SECTION JJ-JJ'

SECTION KK-KK'

SECTION LL-LL'

SECTION MM-MM'

SECTION NN-NN'

SECTION OO-OO'

SECTION PP-PP'

SECTION QQ-QQ'

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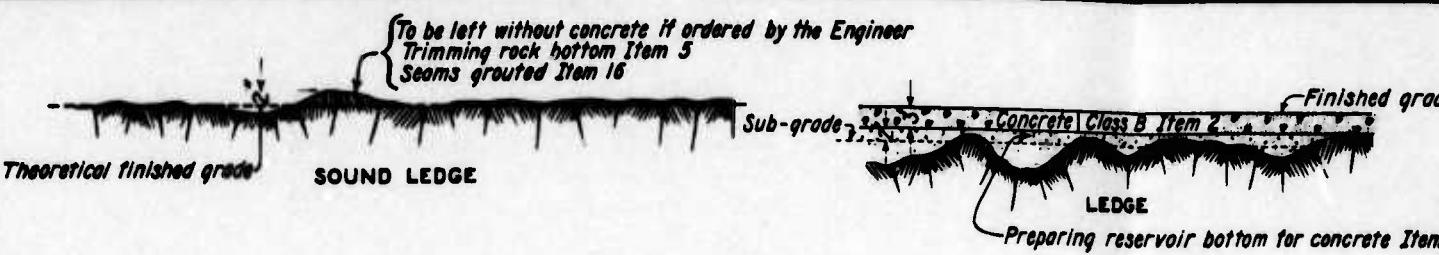
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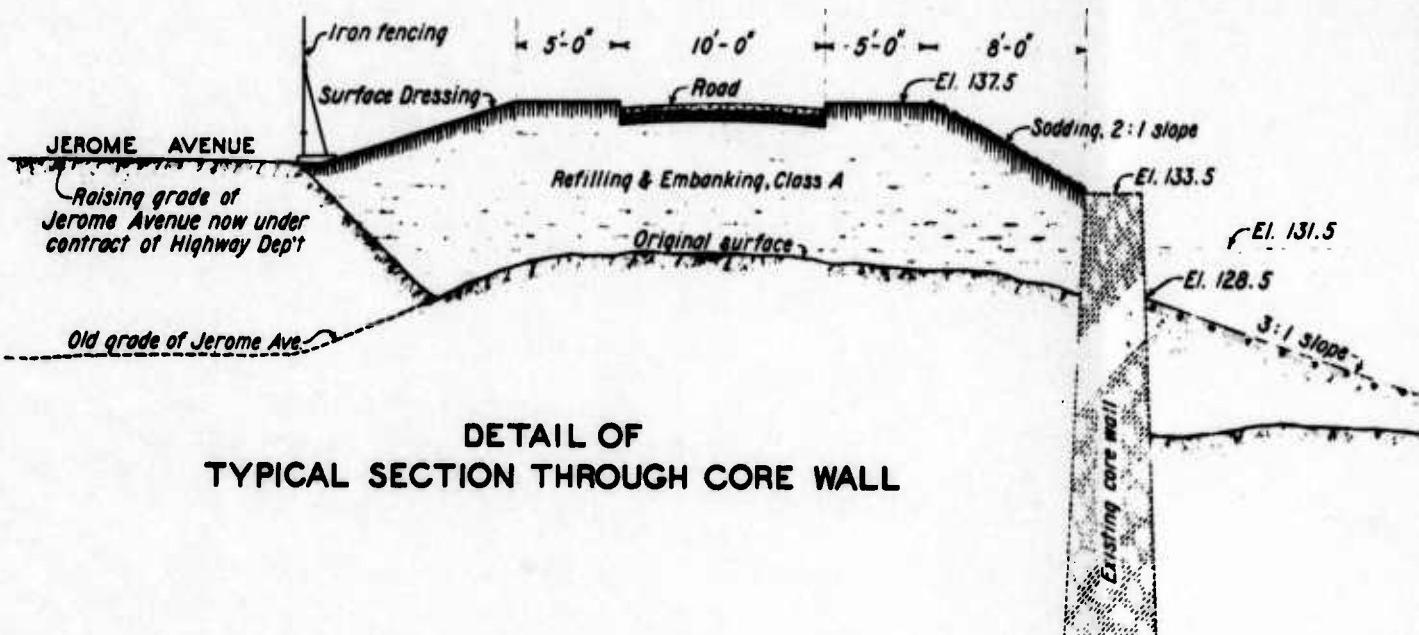
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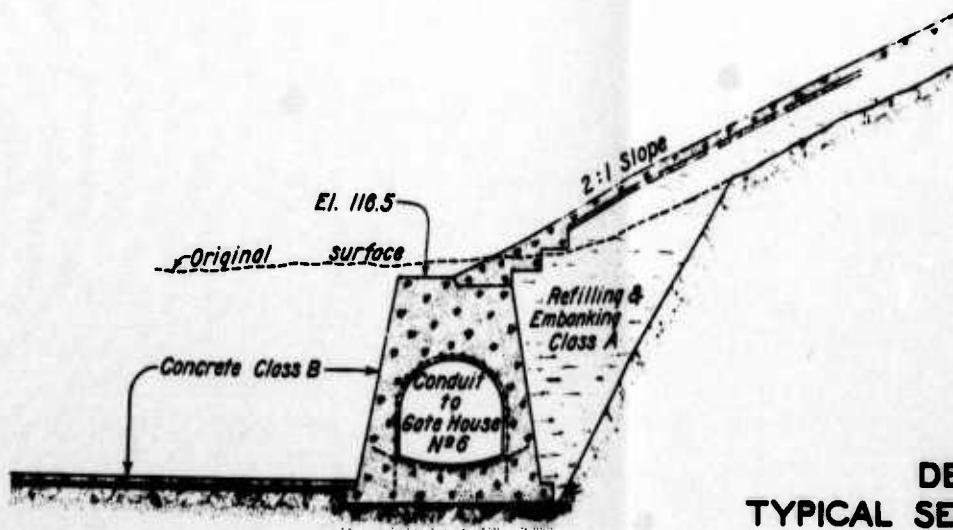
SECTION QQ-QQ'



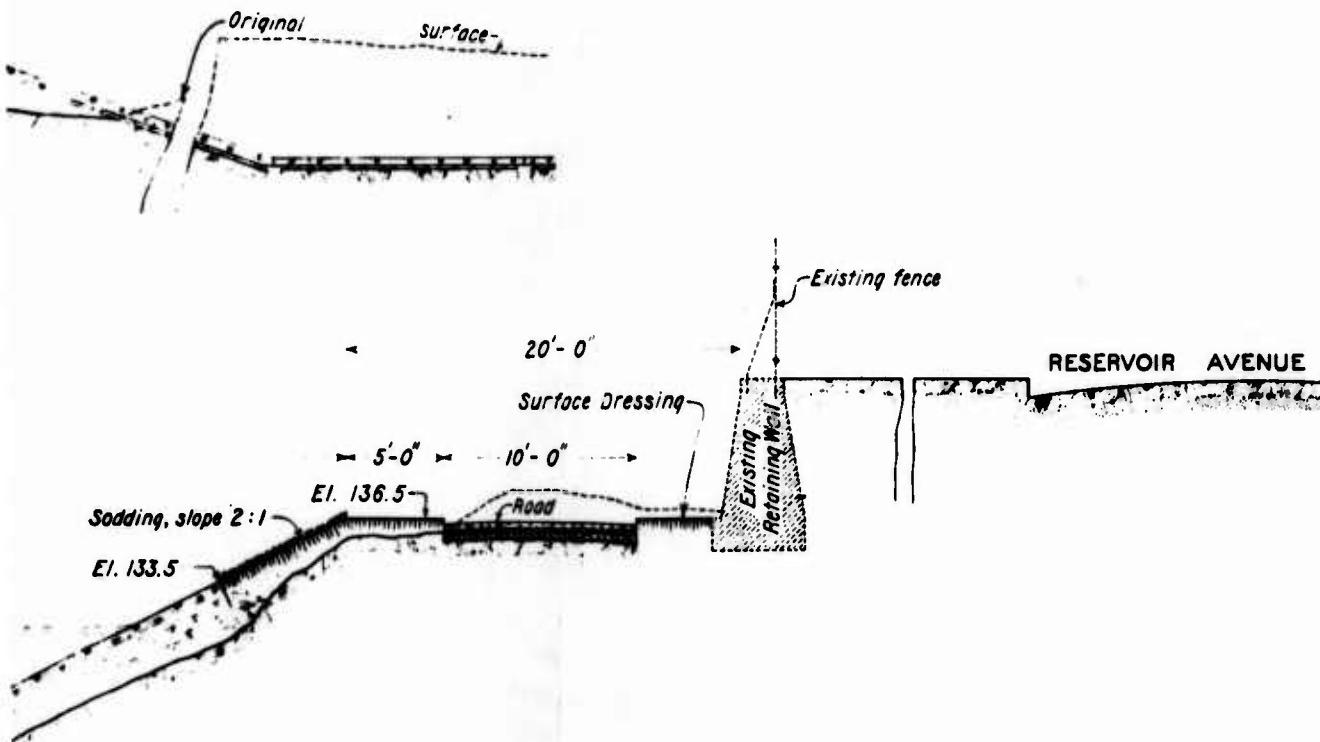
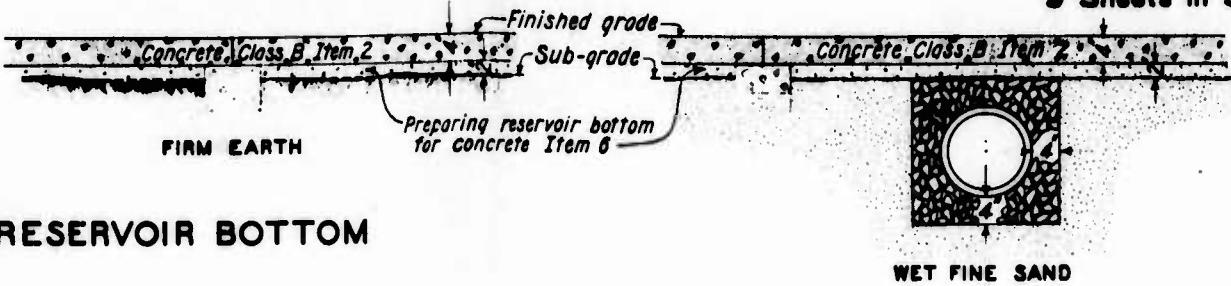
TYPES OF FINISH



DETAIL OF TYPICAL SECTION THROUGH CORE WALL



DE TYPICAL SE



CITY OF NEW YORK
DEPARTMENT OF WATER SUPPLY, GAS & ELECTRICITY
BOROUGHS OF MANHATTAN AND THE BRONX
CONTRACT DRAWINGS
FOR
COMPLETING THE EASTERLY BASIN
OF THE
JEROME PARK RESERVOIR
LINING AND EMBANKMENTS

10183FT.
OCT. 1910

Assistant Engineer
CONVERSE WARD DAVIS DIXON
CONSULTING ENGINEERS
PLATE III SEPTEMBER 1978

Chief Engineer

DETAIL OF
SECTION NEAR A-A

HALF-PLAN

This detailed architectural floor plan, labeled "HALF - SE AT ELEV.", depicts a multi-story building layout. The plan includes various rooms, hallways, and structural elements. Key features include a central entrance area, multiple bedrooms, a bathroom, and a kitchen/dining room complex. Structural details such as columns, beams, and support posts are shown throughout the space. The plan is oriented with a vertical axis and includes specific elevation levels and room names.

HALF - SECTION
AT ELEV. 131.5

Note: Licensee agrees to pay Seller a sum of
\$61.00 above Current Balance.

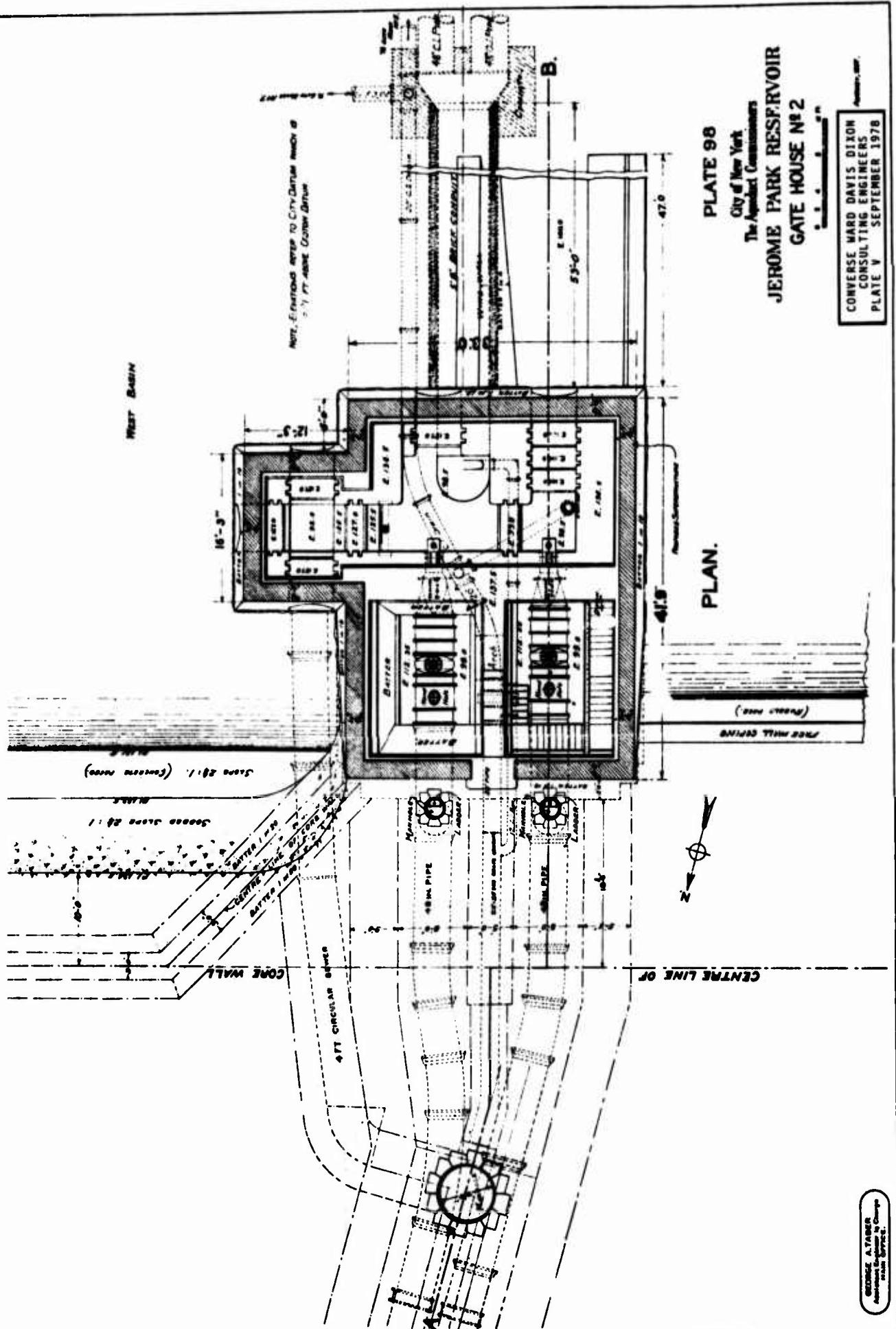
CITY OF NEW YORK PLATE 110
THE APPROPRIATE COMMISSIONERS
JEROME PARK RESERVOIR
GATE HOUSE No 7

August, 1907

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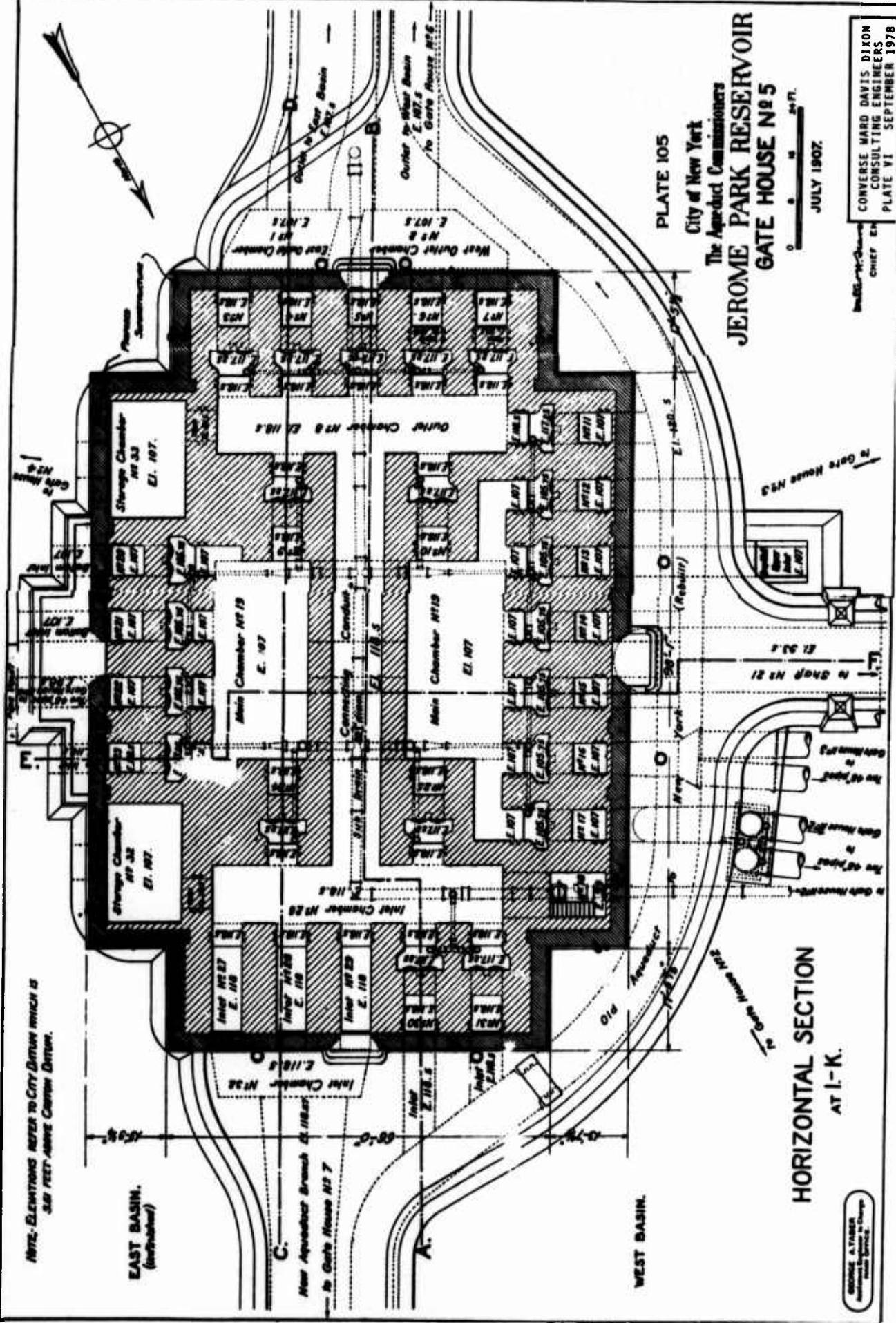
CONVERSE WARD DAVIS DIXON
CONSULTING ENGINEERS
PLATE IV SEPTEMBER 1978

EUREKA
COM



EDWARD A. TABER
Associate Engineer in Charge
of the Bureau.

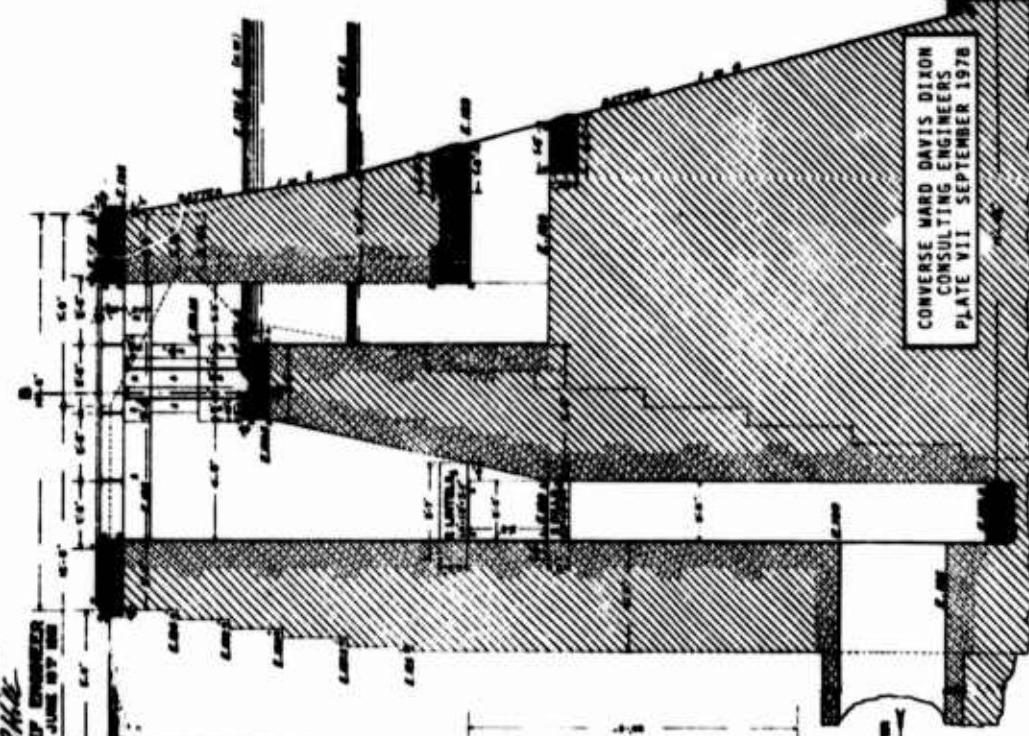
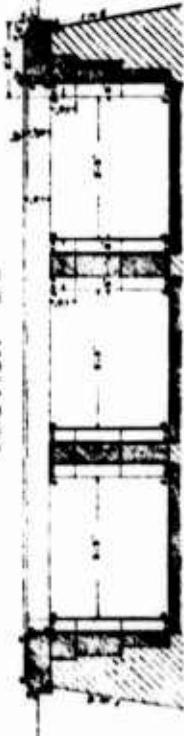
HENZ-ELMONT REFER TO CITY DRAW WHICH IS
35 FEET ABOVE CROWN DRAWD.



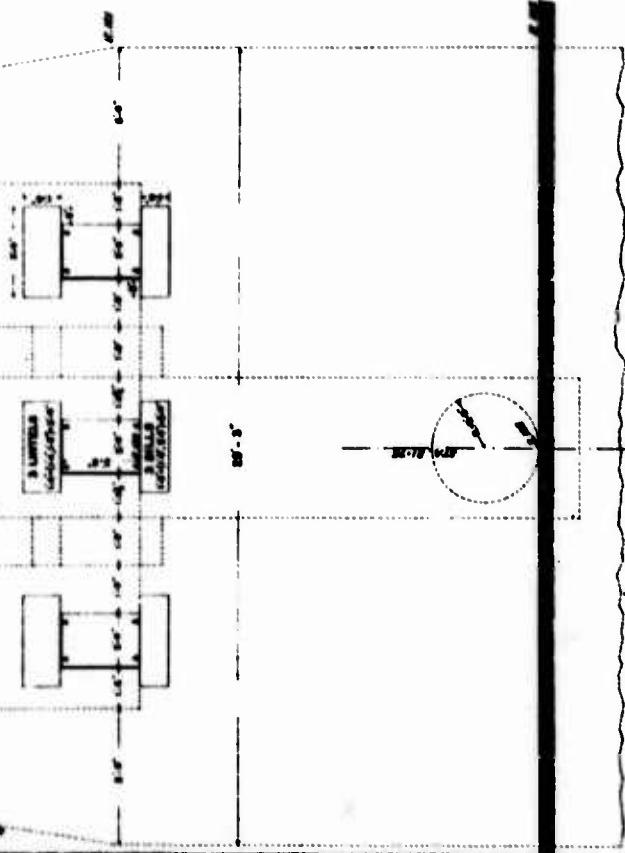
THE AQUEDUCT COMMISSIONERS

JEROME PARK RESERVOIR PLATE 113
WASTE WEIR OR SPILLWAY
FOR
WEST SIDE OF RESERVOIR

SECTION BB



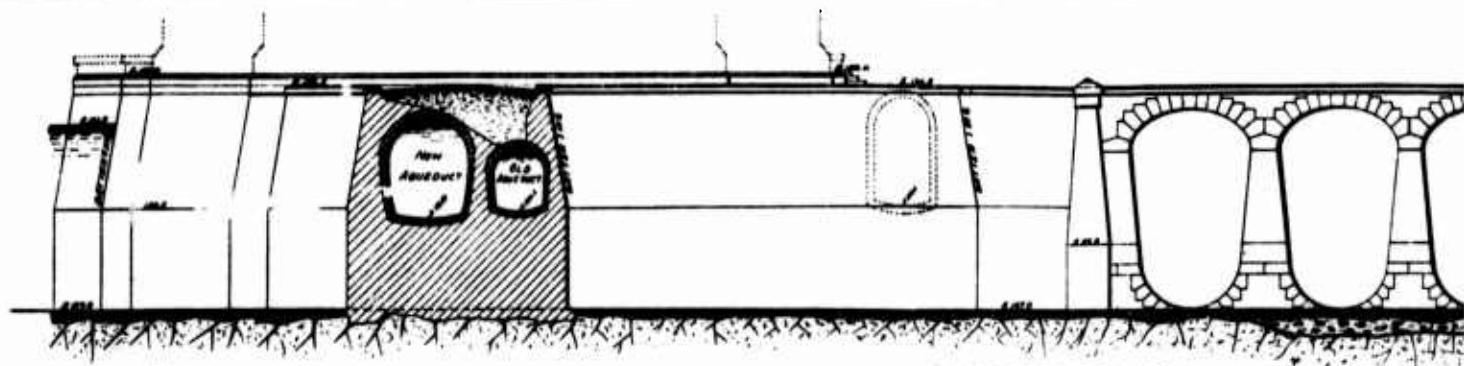
PLAN OF TOP COURSE



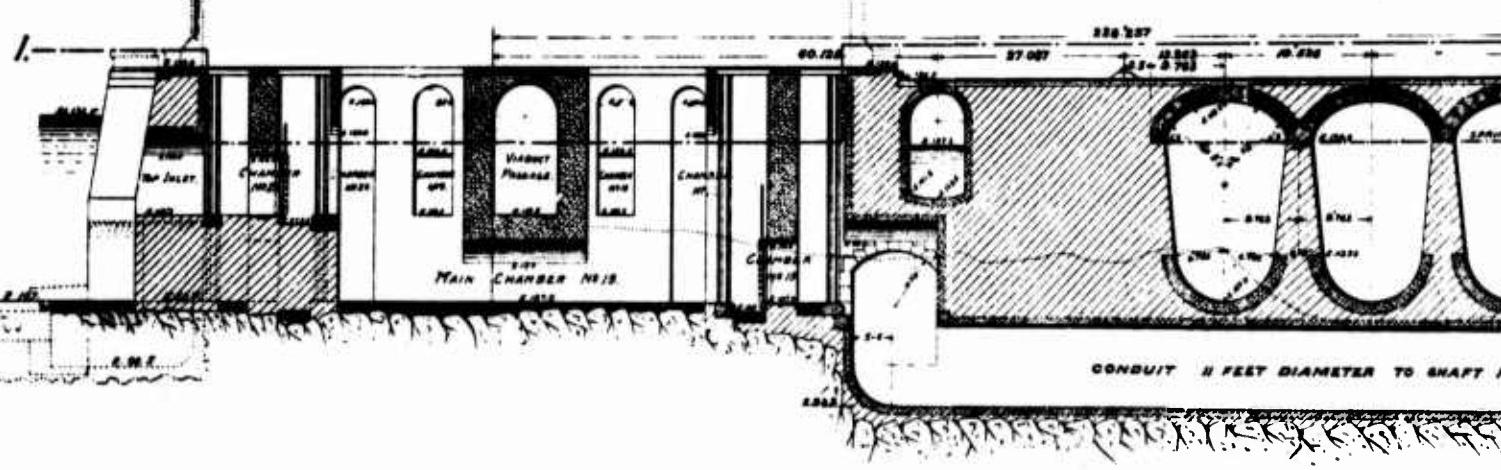
CONVERSE WARD DAVIS DIXON
CONSULTING ENGINEERS
PLATE VII SEPTEMBER 1918

Architect
Davis Dixon
Sept. 1918

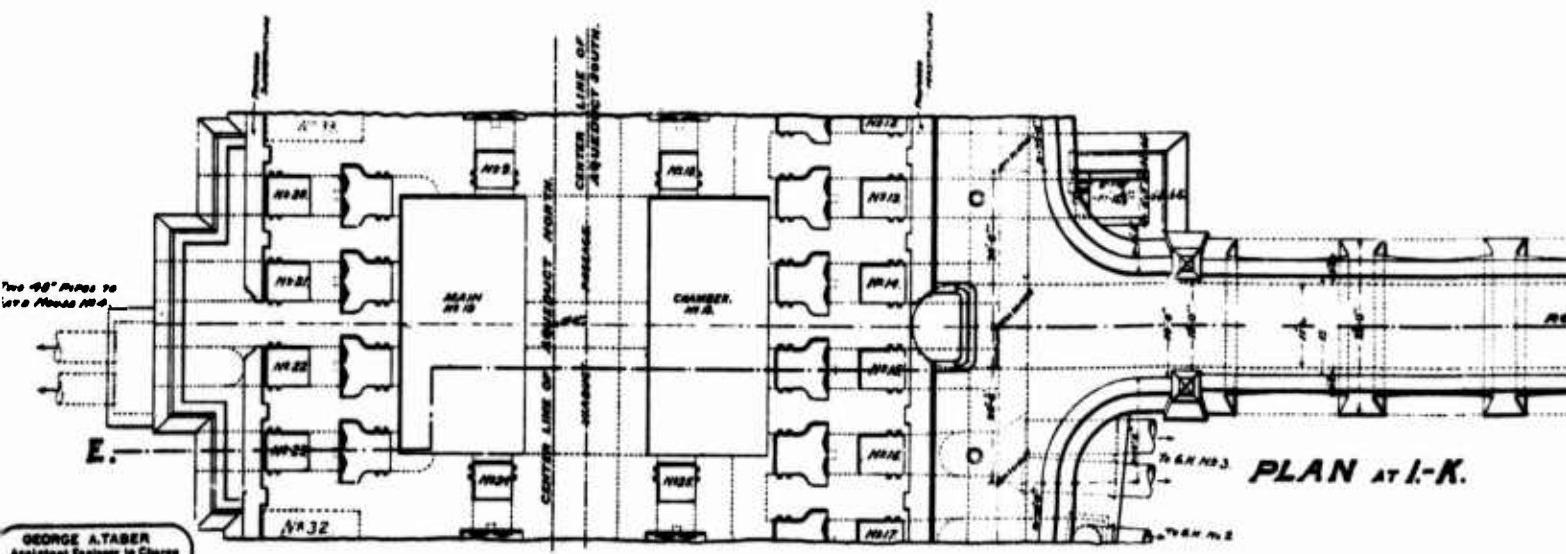
SECTION AA
AT STA. 1101



ELEVATION (LOOKING SOUTH.)

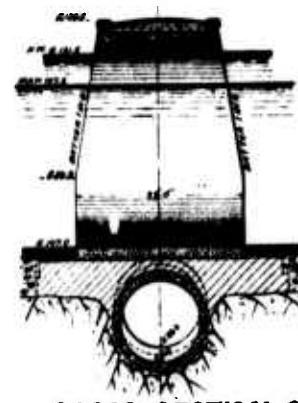
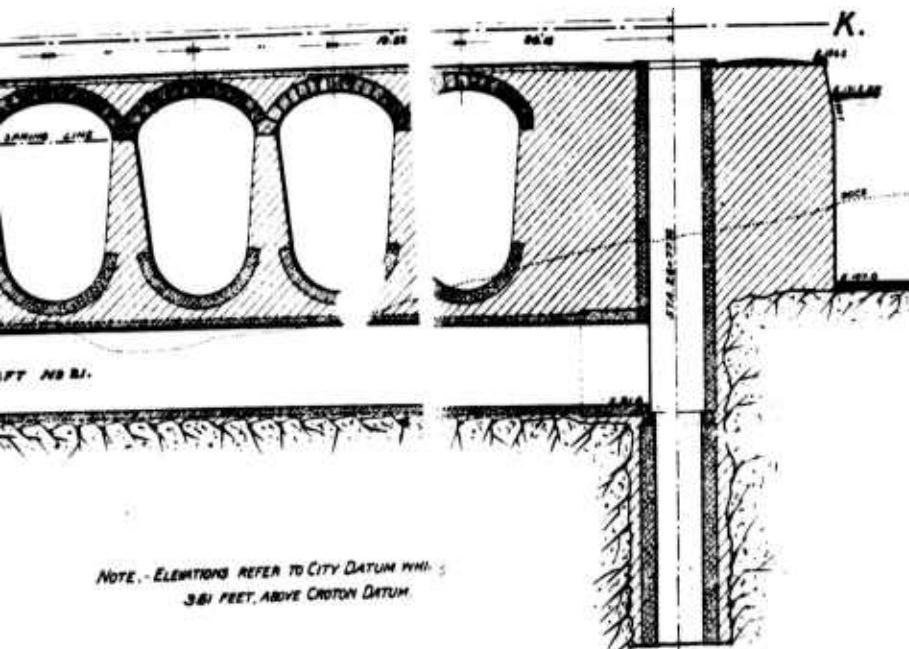
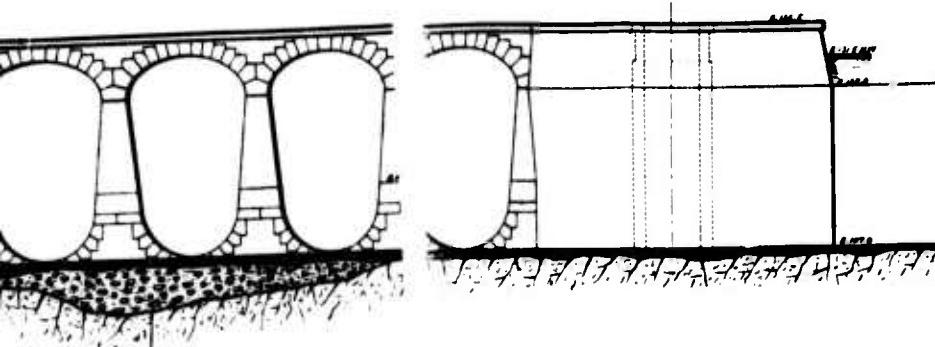


LONGITUDINAL SECTION E.-F.



GEORGE A. TABER
Assistant Engineer in Charge
MAIN OFFICE.

2



CROSS SECTION G-H.

NOTE.—ELEVATIONS REFER TO CITY DATUM WHICH IS
381 FEET ABOVE CROTON DATUM.

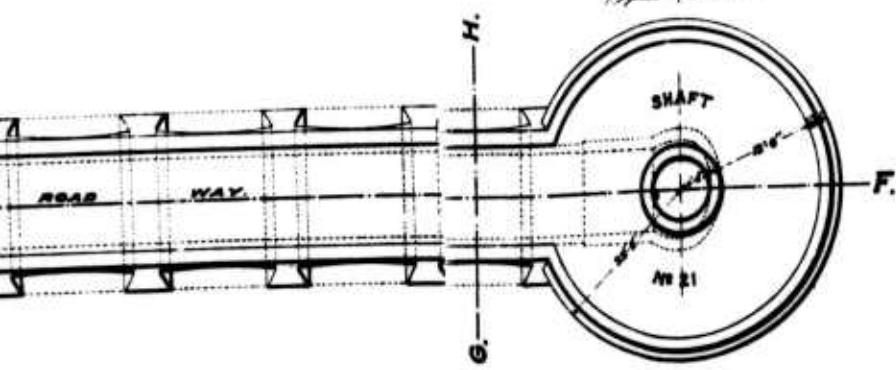
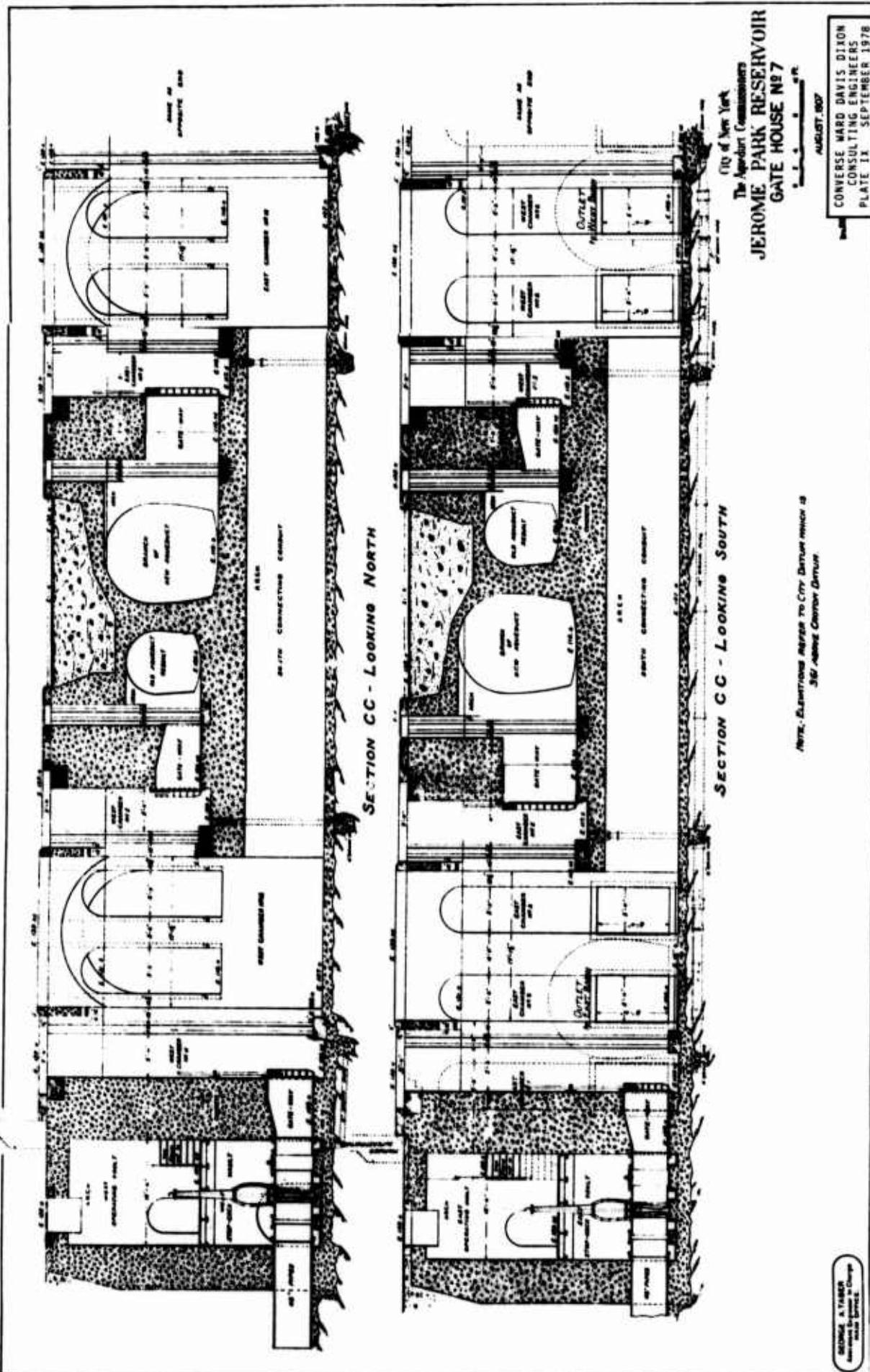


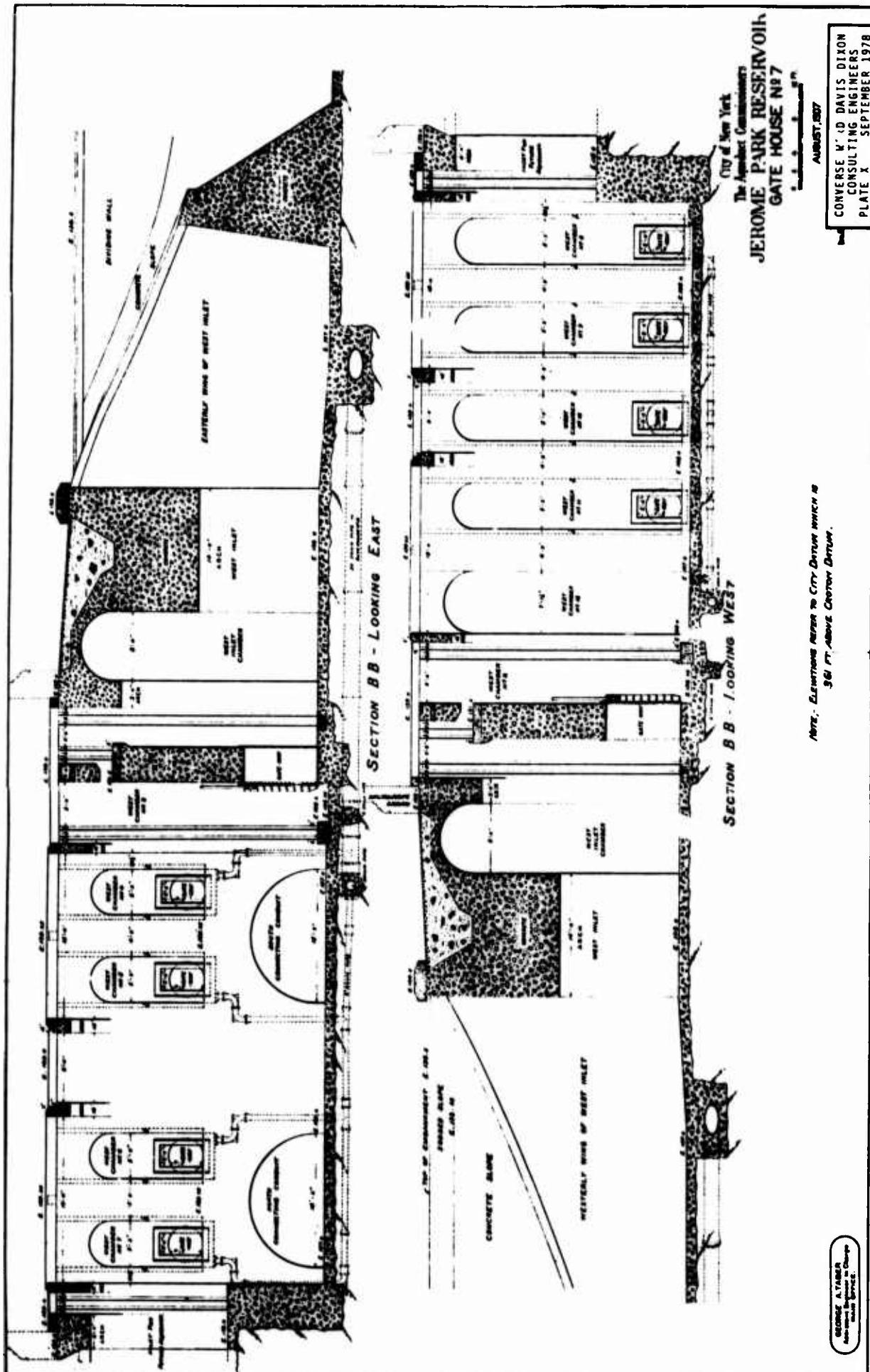
PLATE 107
City of New York
The Aqueduct Commissioners.
**JEROME PARK RESERVOIR
GATE HOUSE NO. 5.**

CHIEF ENGINEER

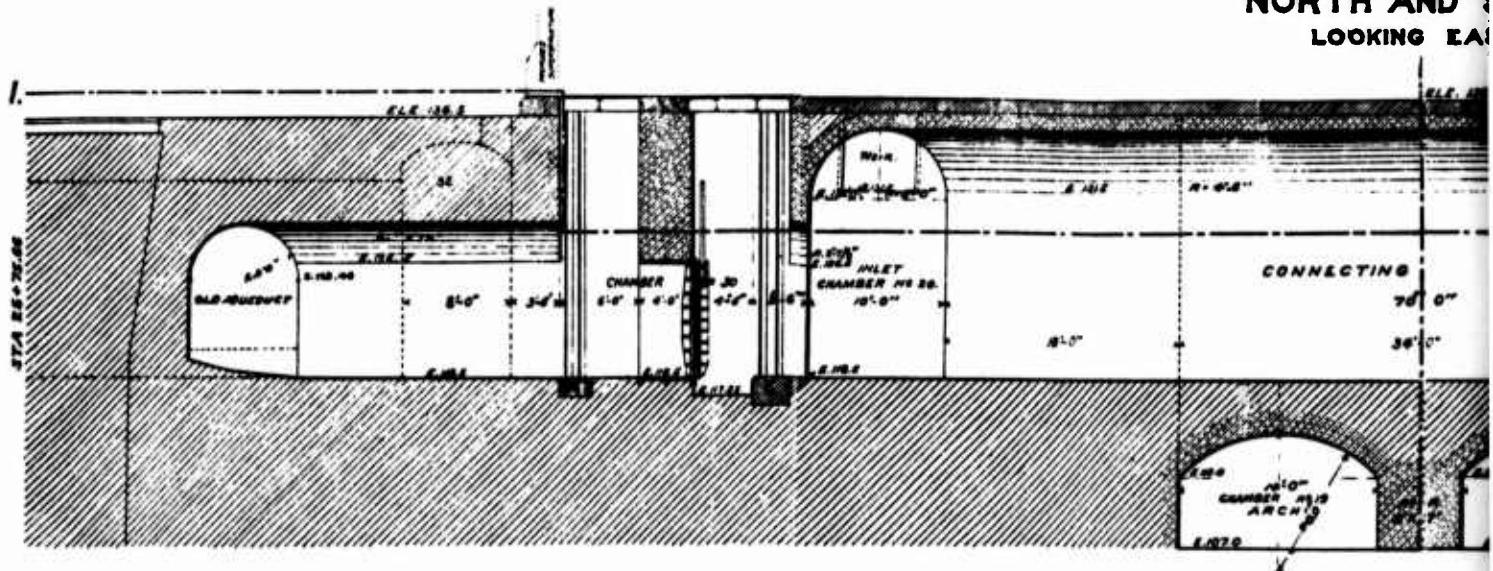
JULY, 1907

CONVERSE WARD DAVIS DIXON
CONSULTING ENGINEERS
PLATE VIII SEPTEMBER 1978

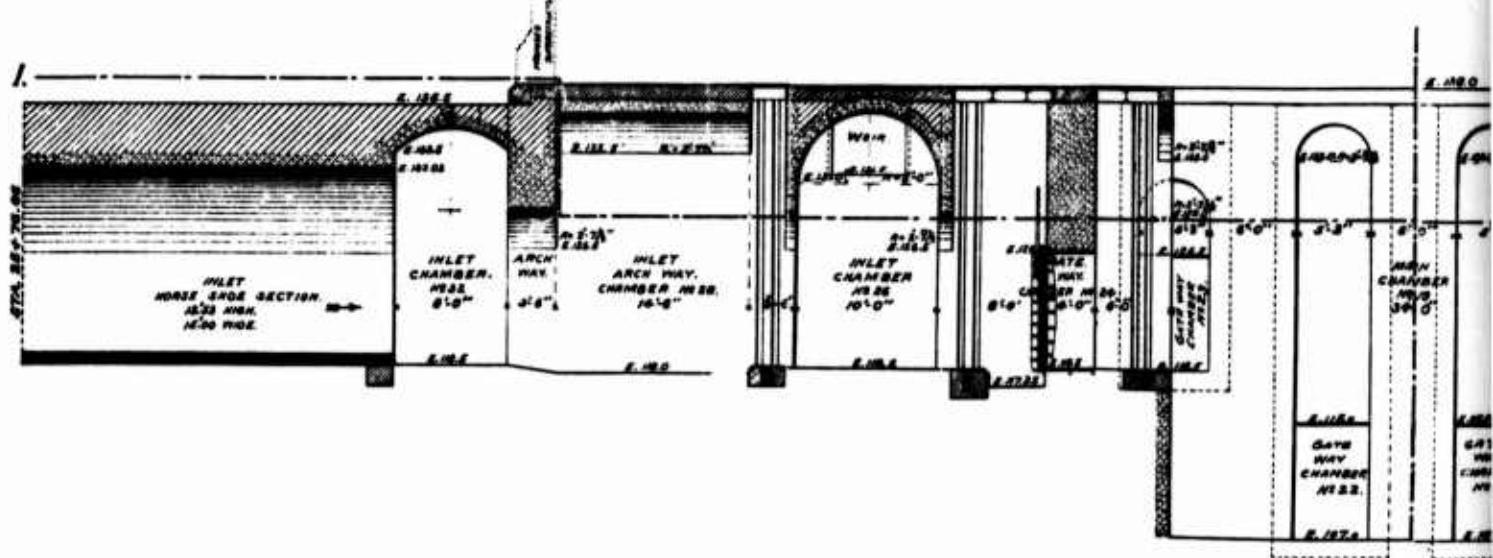




**SECTIONS
NORTH AND S
LOOKING EAST**

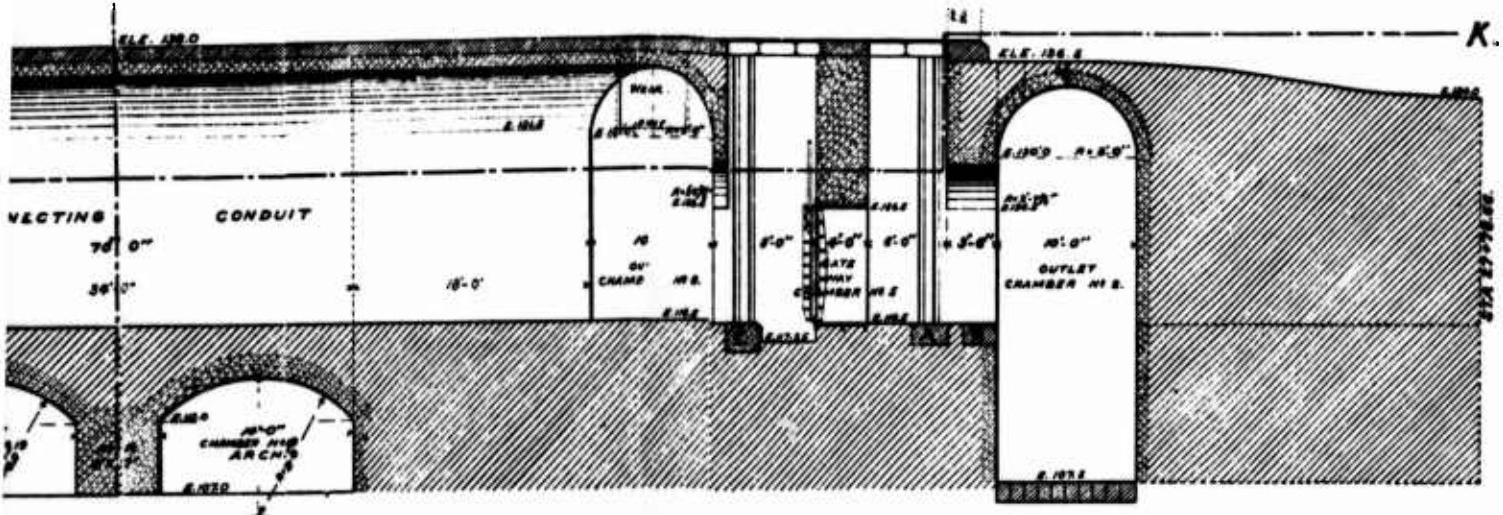


SECTION A-B. THROUGH CHAMBER'S NO. 32



SECTION C-D. THROUGH INLET, CHAMBER'S NO. 32.28

**SECTIONS
TH AND SOUTH.
LOOKING EAST.**



NUMBER'S NOS. - 30 . 26 . 19 . 8 . 5 AND 2.

**NOTE.-ELEVATIONS REFER TO CITY DATUM WHICH IS
3.6 FT. ABOVE CROTON DATUM**

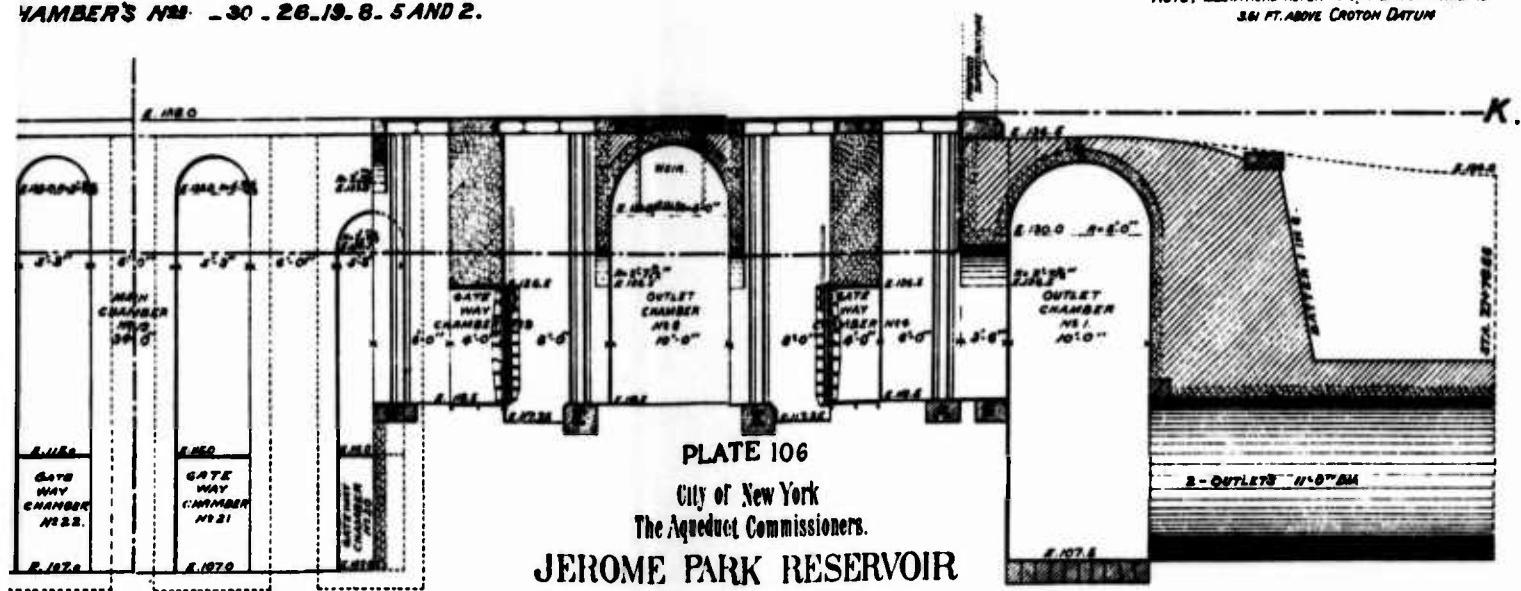


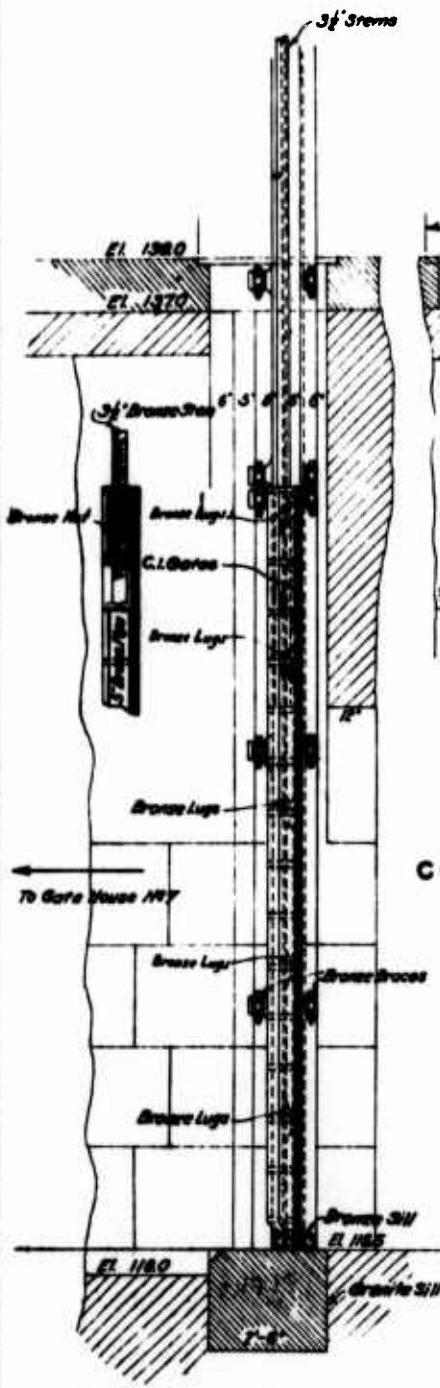
PLATE 106
City of New York
The Aqueduct Commissioners.
JEROME PARK RESERVOIR
GATE HOUSE N° 5.

NUMBER'S NOS. 28 . 26 . 24 . 19 . 9 . 8 . 4 . 1 AND OUTLET

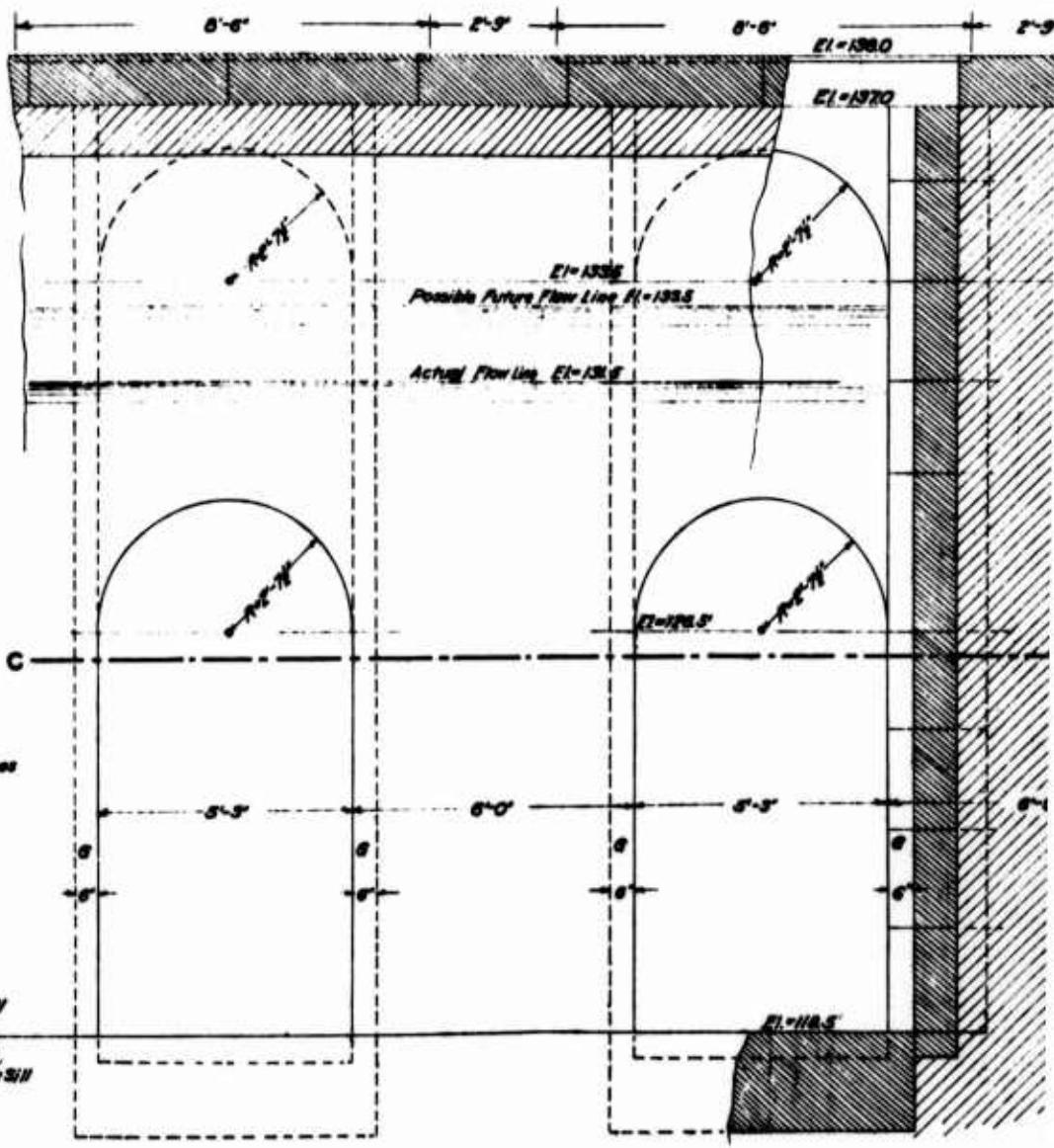
JULY 1977

**INTERNS
CHIEF ENGINEER**

**CONVERSE WARD DAVIS DIXON
CONSULTING ENGINEERS
PLATE XI SEPTEMBER 1978**



SIDE ELEVATION A-A
Scale $\frac{1}{2}$ in = 1 Ft.

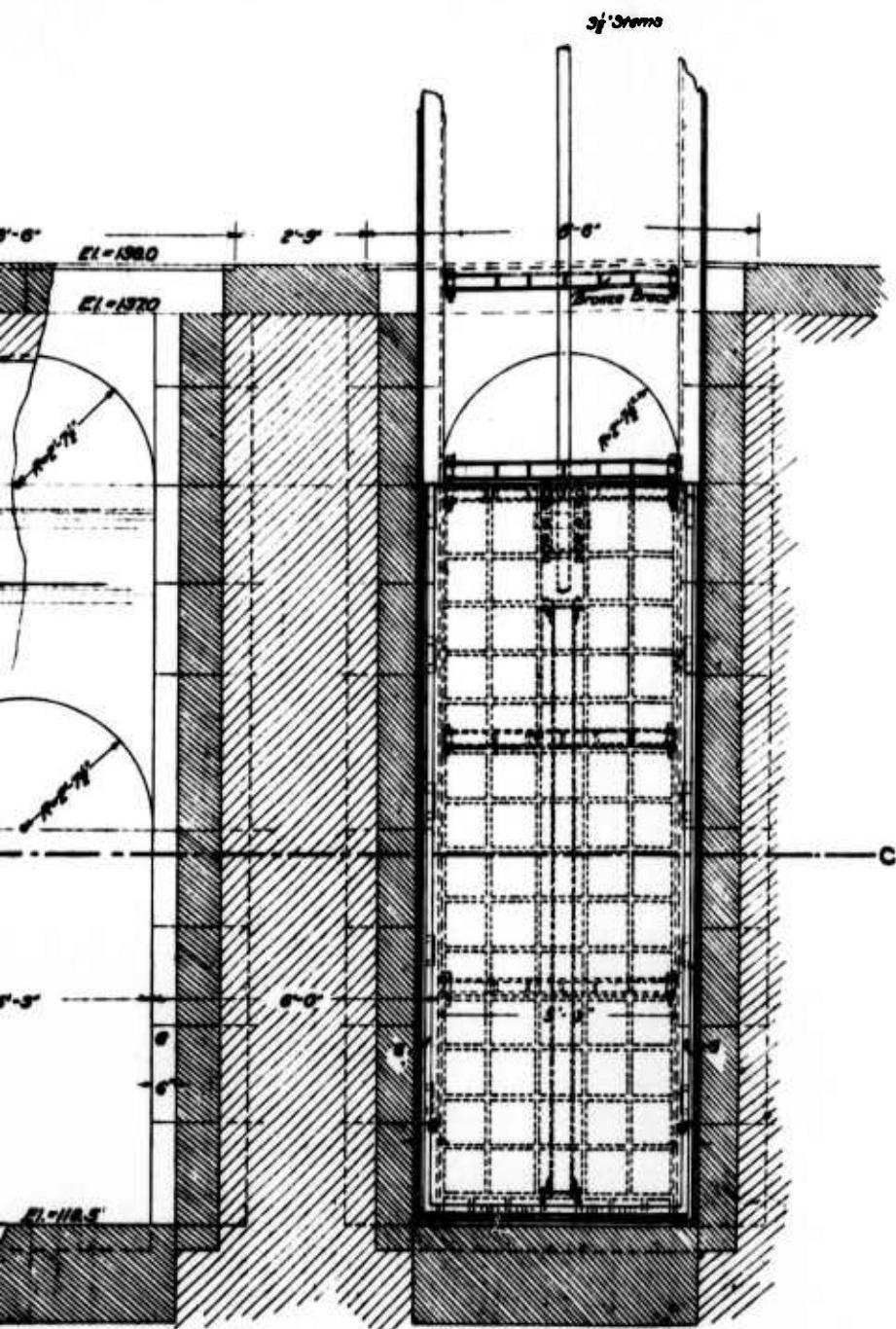


FRONT ELEVATION AND SECTION B-B
Scale $\frac{1}{2}$ in = 1 Ft.

NOTE. Elevations refer to City Datum

DESIGNED BY *[Signature]*
DRAWN BY *[Signature]*
TRACED BY LINKEE
CHECKED BY *[Signature]*

*3 Sheets in Set.
Sheet No 2*



AND SECTION B-B
 $\frac{1}{2}$ IN.=1 FT.

CITY OF NEW YORK
DEPARTMENT OF WATER SUPPLY, GAS & ELECTRICITY
BOROUGHS OF MANHATTAN & THE BRONX
CONTRACT DRAWINGS

**Sluice Gates, Lifting Apparatus and Shed
AT GATE HOUSE NO. 5
Jerome Park Reservoir**

SCALES AS SHOWN

Answers, Exercises

CONVERSE WARD DAVIS DIXON

CONSULTING ENGINEERS

PLATE XII SEPTEMBER 1978

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APPENDIX A
CHECKLIST - ENGINEERING DATA

CHECKLIST

HYDROLOGIC AND HYDRAULIC DATA

ENGINEERING DATA

NAME OF DAM: Jerome Park Reservoir Dam NDS ID NO.: NY 64RATED CAPACITY (ACRE-FEET) 2380 NYS DEC ID NO.: 135 LHELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 135.1ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 135.1ELEVATION MAXIMUM DESIGN POOL: 140.1ELEVATION TOP DAM: 140.1

CREST (Waste Weir Spillway):

- a. Elevation 135.1
- b. Type Cut granite - sharp crested weir
- c. Width 2.75 feet
- d. Length Three sections each 5.25' separated by 1.75' pier
- e. Location Spillover Northwestern perimeter between GH #2 and #3
- f. Number and Type of Gates None

OUTLET WORKS (Gate House Nos. 2 and 3):

- a. Type 2-48" diam. cast iron pipes that lead to gated*
- b. Location At base of gated chamber; east side of gate house
- c. Entrance inverts 99.1
- d. Exit inverts Unknown
- e. Emergency draindown facilities 2-48" diam. cast iron pipes that empty into the Broadway Sewer (GH #2 only. Pipes in GH #3 plugged.)

- a. Type None
- b. Location None
- c. Records None

MAXIMUM NON-DAMAGING DISCHARGE: 200 cfs (approximate)

*chamber in GH #5.

CHECKLIST

HYDROLOGIC AND HYDRAULIC DATA

ENGINEERING DATA

OUTLET WORKS (Gate House No. 5):

- a. Type Gated, 11-foot diameter concrete conduit
- b. Location West side of GH #5 to drop inlet of Shaft #21
- c. Entrance invert 97.1
- d. Exit invert 95.0
- e. Length 175± feet

OUTLET WORKS (Gate House No. 5):

- a. Type 2-48" diam. cast iron pipes that lead to Bronx distribution system
- b. Location At base of gated Outlet Chamber #22; east side of gate house
- c. Entrance invert 102.1
- d. Exit invert Unknown
- e. Length Unknown

CHECKLIST**ENGINEERING DATA****DESIGN, CONSTRUCTION, AND OPERATION
PHASE I**

NAME OF DAM: Jerome Park Reservoir Dam

NDS ID NO.: NY 64NYS DEC ID NO.: 135 LH

sheet 1 of 5

ITEM	REMARKS
DRAWINGS	There are approximately 610+ design drawings on file at Manhattan office of NYCDWRBWS
REGIONAL VICINITY MAP	Dam shown on USGS 7½ minute quads of Central Park, N.Y.-N.J. (N4045.0, W7352.5) and Yonkers, N.Y.-N.J. (N4052.5, W7352.5)
CONSTRUCTION HISTORY	Available at Bronx Office of NYCDWRBWS in form of book entitled <u>Report of the Aqueduct Commissioners for 1895 to 1907.</u>
TYPICAL SECTIONS OF DAM	Available from design drawings, e.g. Plate II
HYDROLOGIC/HYDRAULIC DATA	Inflow and outflow records available at Manhattan office of NYCDWRBWS. Entitled <u>Croton Delivery and Consumption</u> . No hydraulic data available except for details of typical gate structure (Plate XIII). Conventional hydrologic data not applicable: no local watershed controlled inlet from supply watershed.

ENGINEERING DATA

Sheet 2 of 5

ITEM	REMARKS
OUTLETS: Plan Details Constraints Discharge Ratings	Plans and details available for outlets in Gate House Nos. 2, 3, 5 and 6. No constraints or discharge ratings available for any of the above.
RAINFALL/RESERVOIR RECORDS	Refer to "Hydrologic/Hydraulic Data" on previous page
DESIGN REPORTS	None available
GEOLOGY REPORTS	Some geologic cross sections available in design drawings. No formal reports available.
DESIGN COMPUTATIONS: Hydrology & Hydraulics Dam Stability Seepage Studies	None available

ENGINEERING DATA

Sheet 3 of 5

ITEM	REMARKS
MATERIALS INVESTIGATIONS Boring Records Laboratory Field	No results of materials investigations available. Geological sections shown on some drawings of boring location plans and profiles.
POST-CONSTRUCTION SURVEYS OF DAM	None available
BORROW SOURCES	None available
MONITORING SYSTEMS	None for dam. Water quality and flow quantity carefully monitored in Gate House No. 5.
MODIFICATIONS	"East Basin" shown on all original design drawings was never completed. Gate house superstructures rebuilt in 1938/39. Microstrainer plant added to Gate House No. 6 in 1966/67. Two 48-inch diameter outlets to sewer in Gate House No. 3 were plugged in 1942/43.

ENGINEERING DATA

Sheet 4 of 5

ITEM	REMARKS
HIGH POOL RECORDS	Available from operations records; see "Maintenance and Operations Records" below
POST-CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None available
PRIOR ACCIDENTS OR FAILURE OF DAM Description Reports	None reported
MAINTENANCE AND OPERATION RECORDS	No formal maintenance records available. Information on major maintenance projects available from drawing file. Operating records entitled <u>Croton Delivery and Consumption</u> available. These records contain <u>reservoir elevation</u> measured daily; they extend back to time when dam was first put into service (1907).
SPILLWAY: Plan Sections Details	Plan, section and details of waste weir spillway available in drawings on file at Manhattan office of NYCDWRBWS (Plate VII)

ENGINEERING DATA

		SHEET <u>5</u> OF <u>5</u>
ITEM	REMARKS	
OPERATING EQUIPMENT: Plans Details	Plans and details available for typical gate structure and lifting apparatus (Plate XII)	
PREVIOUS INSPECTION Date: Findings	None on file with NYSDEC	

APPENDIX B
CHECKLIST - VISUAL INSPECTION

CHECKLIST

VISUAL INSPECTION

PHASE I

NAME OF DAM: Jerome Park Reservoir Dam County: Bronx State: New York NDS ID No.: NY 64
NYS DEC ID No.: 135 LH

Type of Dam: Earth embankment/core wall Hazard Category: High

Date(s) Inspection: 1 August 1978 Weather: Overcast Temperature: 68°F

Pool Elevation at Time of Inspection: 135.5 msl

Tailwater at Time of Inspection: N/A msl

Inspection Personnel:

E. A. Nowatzki (CWDD)	G. Kuse (NYCDWSGE)	P. Gossen (LZA)
G. S. Salzman (CWDD)	T. Hook (NYCDWSGE)	
A. Raguucci (NYCDWSGE)	E. Bronstein (NYCDWSGE)	
E. A. Nowatzki	Recorder	

Remarks:

EMBANKMENT

Sheet 1 of 2

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None visible	Minor cracks in perimeter road not associated with embankment cracks
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None visible	
SLoughing or Erosion: Embankment Slopes Abutment Slopes	None visible	
Vertical and Horizontal Alignment of the Crest	Appears OK both horizontally and vertically	
Riprap Failures	No rip rap. Mortared laid-up stone in some areas with vertical face at water line; appears to be in good condition	

EMBANKMENT

Sheet 2. of 2

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT WITH: Abutment Spillway Other Features	Appears OK	Embankment abuts toe wall on north, west and south portion of perimeter
ANY NOTICEABLE SEEPAGE	None visible	
RECORDING INSTRUMENTATION		None observed and none shown on plans
DRAINS		None observed

OUTLET WORKS

Sheet 1 of 2

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Actual outlet conduits not visible. Concrete in Gate House 5 chambers appears to be in generally good condition.	
INTAKE STRUCTURE	No inlet points were visible	Intake gates to Gate House No. 5 are located in each of Gate Houses 2 and 3 to feed two twin 48" pipes that lead to stilling basin in Gate (REFER TO SHEET 2)
OUTLET STRUCTURE	No outlet points were visible. 4 gates leading to Shaft 21 which leads to Central Park Reservoir and other gates that lead to supply lines for (REFER TO SHEET 2)	Gate House 5 contains 4 gates that feed Shaft 21 which leads to Central Park Reservoir and other gates that lead to supply lines for (REFER TO SHEET 2)
OUTLET CHANNEL	Not visible	Outlet channel is basically the Manhattan and South and East Bronx water supply systems.
EMERGENCY GATE	Not visible	Gate House 2 contains gates for emergency discharge of reservoir into Broadway storm sewer which empties into Harlem River. Gate House 2 sealed but apparently can be opened quickly.

Sheet 2 of 2

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS	
INTAKE STRUCTURE		<p>House 5. Inlet to stilling basin controlled at Gate House 5. An additional intake to stilling basin occurs through arched dome tunnel immediately west of Gate House 5. Controlled by gates in Gate House 5. Other gates in Gate House 5 are direct take off from the New Croton Aqueduct.</p>	
OUTLET STRUCTURE		<p>South and East Bronx. Gate House 6 contains gates that allow discharge to South Bronx water system; presently inoperative.</p>	

UNGATED SPILLWAY

sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	Not visible, but could hear water flowing over spillway into drop inlet. Metal plates replaced grills; metal plates welded closed because of vandalism.	This is a covered, drop inlet overflow spillway. Water flows from drop inlet to Gate House 2 and then to Broadway Sewer (Refer to EMERGENCY GATE).
APPROACH CHANNEL	None	
DISCHARGE CHANNEL	Not visible	The discharge channel is the Broadway Sewer.
BRIDGE AND PIERS	None	

INSTRUMENTATION

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None visible	
OBSERVATION WELLS	None observed	
WEIRS	None observed	
PIEZOMETERS	None observed	
OTHER	Water level gages and flow meters monitor flow into and out of reservoir in Gate House 5.	

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
GATE HOUSE NO. 7	All 4 gates manually operated well.	Contains 4 take off gates from Jerome Park Branch of New Croton Aqueduct. Take off empties directly into reservoir at north end.
GATE HOUSE NO. 5	Only 1 of 6 gates manually operated. Other 5 gates non-functional due to missing lock dogs. They are in open position.	Contains 6 take off gates from Jerome Park Branch of New Croton Aqueduct for delivery to reservoir by south portal.
GATE HOUSE NO. 1	Not observed	Located at Van Cortland Park north of reservoir. Sealed (due to vandalism) in open position on New Croton Aqueduct upstream of reservoir. Can be used to divert flow in Jerome Park Branch of New Croton Aqueduct and thereby control flow into Jerome Park Reservoir.

Sheet 2 of 2

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
GATE AT CROTON RESERVOIR	Not observed	Flow into New Croton Aqueduct controlled by gate on command from operating engineer at Jerome Park Reservoir.

RESERVOIR

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	<p>Stability: Earth embankment slopes about 3 horizontal to 1 vertical upstream (reservoir side) and 2 horizontal to 1 vertical downstream (street side). Upstream slopes are concrete covered along northern section.</p> <p>Cover: Good grass cover well maintained. Some woody growth on upstream face near water line.</p>	All earthen slopes appear stable. Woody growth (small trees and shrubs) should be removed.
SEDIMENTATION	None observed	Little if any silt; probably some leaves.
OTHER		Stone masonry at water's edge appears recently mortared and well maintained.
		.

DOWNSTREAM CHANNEL

Sheet 1 of 1

VISUAL EXAMINATION OF		OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION		Not applicable (Refer to OTHER below)	
Obstructions			
Debris			
Other			
SLOPES		Not applicable	
Cover			
Stability			
APPROXIMATE NUMBER OF HOMES AND POPULATION		Reservoir is located uphill from urban, high density residential area.	Hazard is "high".
OTHER		The downstream channel is the Broadway storm sewer and the potable water distribution system for Manhattan and the South and East Bronx.	

APPENDIX C
COMPUTATIONS

S. 1. ~~21 N Due 3/2/73~~
 (Kd 87: ~~1/2~~) into ~~1/2~~

Job # 1105
 Date 1-1-74

S. C. ext: Hypothetical - Severe Rain Recession Water Main Survey

1) Sewer capacity

$$\text{El of top of } \begin{matrix} \text{Sewer may} \\ \text{embankment} \end{matrix} \text{ crest} \\ \rightarrow 136.5 - 131.5 = 5'$$

$$Q = CLH^{3/2}$$

$$C_s = 3.22 + 0.4 \left(\frac{L}{P} \right) = 3.22 + 0.4 \left(\frac{5}{11.5} \right) \approx 3.4$$

$$\therefore Q = 3.4 (5.25) (5)^{3/2} \approx 200 \text{ cfs } \checkmark$$

$$Q_t = 3 \times 200 \text{ cfs} = 600 \text{ cfs}$$

CONVERSE WARD DAVIS DIXON, IN
 91 ROSELAND AVENUE
 P. O. BOX 91
 CALDWELL, N. J. 07006

2) Sewer conduit capacity

(Refer to R.T. Chow, Handbook of Applied Hydrology, p. 21-63)

$$Q = a \sqrt{\frac{2gH}{1 + K_e + K_b + K_p L}}$$

$$H = \text{fringe head} = (136.5 - 107) = 29.5 \text{ feet}$$

$$a = \text{cross sectional area of pipe} \approx 12.65 \text{ ft}^2$$

$$K_e = \text{coef for bend loss} = 0.45 \text{ for } \perp \text{ concrete pipe, } n = 0.015$$

$$K_b = \text{coef for friction loss} = 0.00656 \text{ for } 48'' \text{ pipe having } n = 0.015$$

$$K_p = \text{coef for entrance loss} = 0.5 \text{ for } \perp \text{ junction}$$

$$L = \text{length of pipe: (unknown) assume } = 1000 \text{ ft. measured on plate II.}$$

$$\therefore Q = 12.65 \text{ ft}^2 \sqrt{\frac{2(32.2 \text{ ft/sec}^2)(29.5 \text{ ft})}{1 + 0.5 + 0.45 + 1000(0.00656)}}$$

$$Q = 12.65 \text{ ft}^2 \sqrt{\frac{1900}{8.51}} = 189 \text{ cfs} \approx 200 \text{ cfs. } \checkmark$$

3) Entrance Gage Capacity

Assume surface flow through a $3 \times 2'$ rectangular opening with entrance loss $\alpha_{ef} = 0.5$

$$Q = 6 \text{ ft}^2 \sqrt{\frac{2(32.2 \text{ ft/sec}^2)(136.5 - 121.5) \text{ ft}}{1 + 0.5}} = 152 \text{ cfs. } \checkmark$$

$$\therefore 152 \text{ cfs} \times 3 = 456 \text{ cfs } \checkmark$$

Therefore sewer conduit controls discharge at $\approx 200 \text{ cfs.}$

3. New Date: 3/29/78
2/13y: Y10 Date: 9-1-73
Soil: Hydrology of Vernon Lake Reservoir

Job # A1523 E
sheet 1 of 1

Waste water discharge at maximum pool \approx 200 cfs

$$200 \frac{\text{ft}^3}{\text{sec}} = \text{Rain intensity} \times \text{pond area}$$

$$200 \frac{\text{ft}^3}{\text{sec}} = RI \times 94 \text{ acres} \times 43560 \frac{\text{ft}^2}{\text{acre}}$$

$$\frac{200 \frac{\text{ft}^3}{\text{sec}}}{4.1 \times 10^6 \text{ ft}^2} = RI$$

CONVERSE WARD DAVIS DIXON, INC.
91 ROSELAND AVENUE
P. O. BOX 91
CALDWELL, N. J. 07006

$$RI = 4.88 \times 10^{-5} \frac{\text{ft}}{\text{sec}} \times \frac{60 \text{ sec}}{\text{min}} \times \frac{60 \text{ min}}{\text{hr}} = 0.176 \frac{\text{ft}}{\text{hr}} \checkmark$$

$$RI \approx 2''/\text{hr}$$

∴ Waste water can handle this high intensity rainfall even after all of the excess storage capacity of the reservoir has been used up. (first feet)

$$\begin{aligned} \text{Excess storage capacity} &= 94 \text{ acres} \times 43560 \frac{\text{ft}^2}{\text{acre}} \times 5 \text{ ft} \\ &= 20.5 \times 10^6 \text{ ft}^3 \times 7.48 \frac{\text{gals}}{\text{ft}^3} \\ &= 153.34 \text{ million gals} \\ &= 473 \text{ acre feet} \checkmark \end{aligned}$$

Assume constant rain intensity for 24 hours.

Required intensity to use up excess storage capacity (assuming no outflow from river) = $\frac{545}{24 \text{ hrs}} = 2.5''/\text{hr}$

This is not likely to occur for so long a period of time

APPENDIX D
PHOTOGRAPHS



FIGURE 1 EAST RETAINING WALL



FIGURE 2 WESTERN EMBANKMENT AND SEDGEWICK AVENUE
LOOKING NORTH



FIGURE 3 FENCE AND SEDGEWICK AVENUE DOWNSTREAM OF
WESTERN EMBANKMENT LOOKING SOUTH

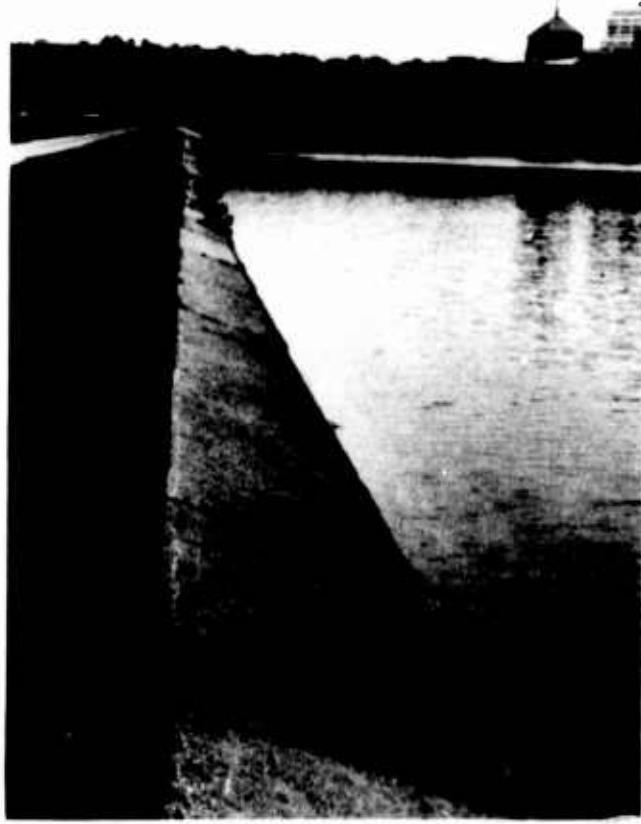


FIGURE 4 CONCRETE APRON AT NORTHERN END OF RESERVOIR



FIGURE 5 WASTE WIER AND SECTION OF RETAINING WALL
AND EMBANKMENT ON WESTERN SIDE OF RESERVOIR



FIGURE 6 GATEHOUSE No. 5 CHLORINATION EQUIPMENT



FIGURE 7 GATEHOUSE No. 5 GATE STAND ARRAYS



FIGURE 8 GATEHOUSE No. 5



FIGURE 9 VIADUCT LEADING FROM GATEHOUSE No. 5 (LEFT)
TO SHAFT No. 21 (RIGHT)



FIGURE 10 GATEHOUSE No. 3

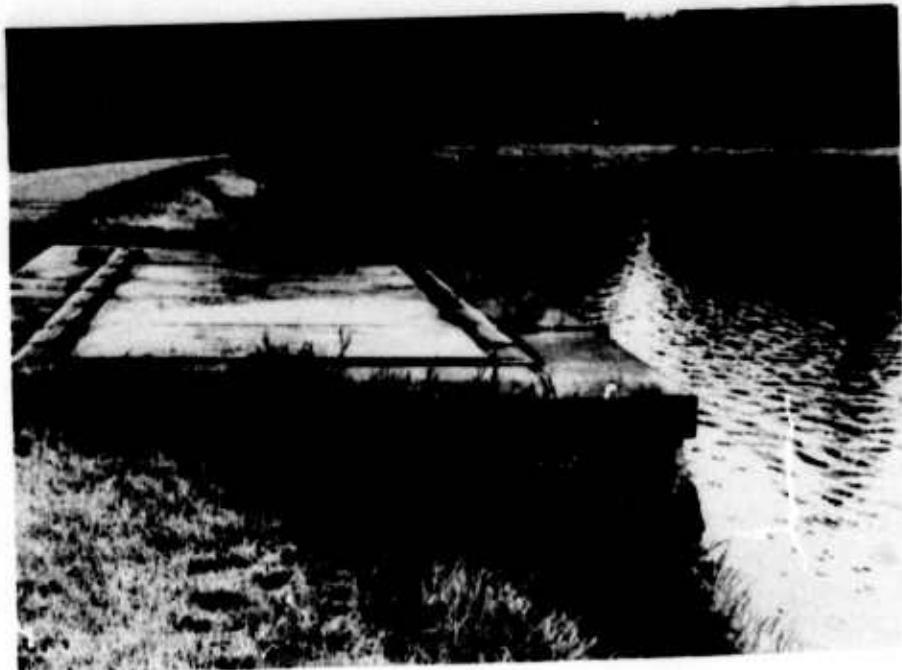


FIGURE 11 WASTE WIER



FIGURE 12 UNPAVED EASTERN PORTION OF PERIMETER ROAD

APPENDIX E
RELATED DOCUMENTS

STATE OF NEW YORK

DEPARTMENT OF

State Engineer and Surveyor

ALBANY

135 L Hudson

Report of a Structure Impounding Water

To assist in carrying out the provisions of Section 22 of the Conservation Law, being Chapter LXV of the Consolidated Laws of New York State, relating to safeguarding life and property and the erection, reconstruction, or maintenance of structures for impounding water, owners of such structures are requested to fill out as completely as possible this report form for each such dam or reservoir owned within the State of New York for which no plans or reports relative thereto are on file in this Department, and to return this report form, together with prints or photographs explanatory thereof to this department.

The Jerome Park Receiving & Distributing Reservoir

1. The structure is in the 24th Ward.....~~Sedgwick Avenue~~ between.....
Town of the City of ~~New York~~ New York.....~~between~~.....
Sedgwick & Jerome Avenues north of the Kingsbridge Road.....
(Give exact distance and direction from a well-known bridge, dam, village main cross-roads or mouth of a stream)

2. Is any part of the structure built upon or does its pond flood any State lands? No.
3. The name and address of the owner is the City of New York.....

4. The structure is used for receiving and distributing water for water supply.
5. The material of the right bank, in the direction with the current, is.....; at the spillway crest elevation this material has a top slope of.....inches vertical to a foot horizontal on the center line of the structure, a vertical thickness at this elevation of.....feet, and the top surface extends for a vertical height of.....feet above the spillway crest.

6. The material of the left bank is.....; has a top slope of.....inches to a foot horizontal, a thickness of.....feet and a height of.....feet.

7. The natural material of the bed on which the structure rests is (clay, sand, gravel, boulders, granite, shale, slate, limestone, etc.).....
sand, gravel hardpan and gneiss

8. State the character of the bed and the banks in respect to the hardness, perviousness, water bearing, effect of exposure to air and to water, uniformity, etc.....practically water-tight.

Note: The reservoir was formed by excavation and embankment.

9. If the bed is in layers, are the layers horizontal or inclined? If inclined what is the direction of the horizontal outcropping relative to the axis of the main structure and the inclination and direction of the layers in a plane perpendicular to the horizontal outcropping?

10. What is the thickness of the layers?

11. Are there any porous stains or fissures?

12. The watershed at the above structure and draining into the pond formed thereby is.....square miles.

13. The pond area at the spillway crest elevation is.....94.....acres and the pond impounds.....10,967,000.....cubic feet of water.

14. The maximum known flow of the stream at the structure was.....cubic feet per second on

(Date)

15. Has the spillway capacity ever been exceeded by a high flow?

Can any possible flood flow from the pond otherwise than through the wastes noted under 17 and 18 of this report?..... If so, give the location, the length and the elevation relative to the spillway crest and the character and slopes of the ground of such possible wastes.

16. State if any damage to life or to any buildings, roads or other property could be caused by any possible failure of the above structure. Describe the location, the character and the use of buildings below the structure which might be damaged by any failure of the structure; of roads adjacent to or crossing the stream below the structure, giving the lowest elevation of the roadway above the stream bed and giving the shape, the height and the width of stream openings; and of any embankments or steep slopes that any flood could pass over. Also indicate the character and use made of the ground below the structure.

If any of the embankments which retain the water stored in the Jerome Park Reservoir should be ruptured considerable damage and probably loss of life might occur.

17. WASTES. The spillway of the above structure is.....feet long in the clear; the waters are held at the right end by a.....the top of which is.....feet above the spillway crest, and has a top width of.....feet; and at the left end by a....., the top of which is.....feet above the spillway crest, and has a top width of.....feet.

18. There is also for flood discharge a pipe.....inches inside diameter and the bottom is.....feet below the spillway crest; and a (sluice, gate outlet).....feet wide in the clear by.....feet high, and the bottom is.....feet below the spillway crest.

For wast weirs of the reservoir see page 4. THIS PAGE IS BEST QUALITY PRACTICABLE
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19. APRON. Below the spillway there is an apron built of.....
(Material)
feet wide and..... feet thick. The downstream side of the apron has a thickness of..... feet
for a width of..... feet.

20. Has the structure any weaknesses which are liable to cause its failure in high flows?

✓

21. SKETCHES. On the back of this report make a sketch to scale for each different cross-section of the above structure at the greatest depth; giving the height and the depth from the surface of the foundation, the bottom width, the top width (for a concrete or masonry spillway at two feet below the crest), the elevation of the top in reference to the spillway crest, the length of the section, and the material of which the section is constructed; on the spillway section show a cross section of the apron, giving its width, thickness and material, and show the abutment or wash wall at the end of the spillway, giving its heights and thickness. Mark each section with a capital letter. Also sketch a plan; show the above sections by their top lines, giving the mark and the length of each; the openings by their horizontal dimensions; the abutments by their top width and top lengths from the upstream face of the spillway section; and outline the apron. Also sketch an elevation of each end of the structure with a cross section of the banks, giving the depth and width excavated into the banks.

22. WATER SUPPLY. The waters impounded by the above structure have (~~not~~) been used for a public water supply since 1906 by the City of New York.

According to the original plans the Jerome Park Reservoir was to consist of "An East Basin and a West Basin ". The construction of the former was abandoned in 1905. The West Basin was completed and put into service in 1906. Stores 103.64 million cubic feet and has a water surface of 94 acres.

For the plans of the Jerome Park Reservoir see Report of the Aqueduct Commissioners for 1895 to 1907.
Plates 94 to 113 inclusive.

Waste weirs to discharge overflowing Water : Are provided at the following points.

In Gate house No. 2. These waste weir each 5-1/4 ft wide.

Waste weir, between Gate houses No. 2 and 3, containing these waste weirs each 5-1/4 ft wide.

Gate house No. 5 has two waste weirs each 5-1/4 ft. wide for the West Basin.

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The above information is correct to the best of my knowledge and belief.

Municipal Building-New York

(Address of signer)

February 1925

(Signature)

Chief Engineer-Bureau of Water Supply

(A person signing for owner should indicate his title or authority)

Dept. N.S.C & E.

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DISTRIBUTION RESERVORIES

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CONSUMPTION		WATER IN		CITY	
DISTRIBUTION RESERVOIRS		CROTON OF CONSUMPTION		WATER IN	
EL. THERM	RES.	135.50 TPD	803.9 MG	EL. CEN	119.40 TPD
CONTEENTS	CONTENTS	1018.4 MG	1112.00	CENTRAL	1112.00
EL. CEN	TOTAL	1112.00	1112.00	EL. CEN	1112.00
CONTENTS	CONTENTS	1112.00	1112.00	CONTENTS	1112.00
GAIN (+)	LOSS (-)	1112.00	1112.00	GAIN (+)	1112.00
CENTRAL	PARK RESIN	1112.00	1112.00	CENTRAL	1112.00
STORE. RESIN	3.11 = 5MG	1112.00	1112.00	STORE. RESIN	3.11 = 5MG
15	16	1112.00	1112.00	15	16

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NEW CROTON DELIVERY A QUEDUCT		CROTON CONSUMPTION APRIL 11 1945	
DEPTH AT CROTON	DEPTH AT CROTON	DEPTH AT CROTON	DEPTH AT CROTON
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
11	11	11	11
12	12	12	12
13	13	13	13
14	14	14	14
15	15	15	15
16	16	16	16
17	17	17	17
18	18	18	18
19	19	19	19
20	20	20	20
21	21	21	21
22	22	22	22
23	23	23	23
24	24	24	24
25	25	25	25
26	26	26	26
27	27	27	27
28	28	28	28
29	29	29	29
30	30	30	30
TOT.	36850.1	35850.1	35850.1
AV.	122.8	6.3	6.3
		3.2	3.2
		119.6	119.6

NEW CROTON DELIVERY APRIL 11 1945		CROTON CONSUMPTION APRIL 11 1945	
DEPTH AT CROTON	DEPTH AT CROTON	DEPTH AT CROTON	DEPTH AT CROTON
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
11	11	11	11
12	12	12	12
13	13	13	13
14	14	14	14
15	15	15	15
16	16	16	16
17	17	17	17
18	18	18	18
19	19	19	19
20	20	20	20
21	21	21	21
22	22	22	22
23	23	23	23
24	24	24	24
25	25	25	25
26	26	26	26
27	27	27	27
28	28	28	28
29	29	29	29
30	30	30	30
TOT.	133.2	733.8	733.8
AV.	111.0	24.4	24.4

Storage and drafts in MILLION GALLONS
All observations at 8 AM of Day

Includes Croton water pumped at Mosholu
But not Crot. Falls, Cross River or W.B.R. to D. I. a/c

MAY 1978

*CONSUMPTION MAY 1
DISTRIBUTION RESERVOIRS*

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~~Mortages and profits in MILLION GALLONS
at 8 a.m. on Day numbered~~

Inclusive Cotton wafers packed at \$12.08
per dozen, Post Paid, C. H. & W. Br.,
Post Office, Fulton, Conn.

(1)

Procedure to Isolate Jerome Park Reservoir from Distribution System

- 1 Shut 2 gates in Gatehouse No. 5 controlling flow from Gatehouse No. 2 (MM 17)
- 2 Shut 2 gates in Gatehouse No. 5 controlling flow from Gatehouse No. 3 (MM 16)
- 3 Shut 2 gates on Gray Well Inlet Gatehouse No. 5 (MM 13)
- 4 Shut 3 gates in Gatehouse No. 5 controlling flow to South Outlet (MM 3-17)
- 5 Open at least 6 of the 8 gates in Gatehouse No. 5 controlling flow from aqueduct to main chamber. (MM 9, 10, 24, 25) (Operation of gates in steps 4 and 5 should be alternated)
- 6 Shut 4 gates in Gatehouse No. 7 controlling flow from aqueduct to east bay.
- 7 Shut 2 gates in Microstrainer Plant to stop flow out of Gatehouse No. 6 Reservoir water is now isolated. Croton water is now supplied to Shaft 21 and East Bronx directly from New Croton Branch Aqueduct in Gatehouse No. 6. Croton water out of Gatehouse No. 6 is replaced with reduced Catskill-Delaware from 12" regulator at 162nd Street and Jerome Avenue. Number of gates to be operated - 24
Length of time required - 4 hours.

Converse, Wm. D. Dixon
Clerk, N. Y. Dept.
ATT: Mr. Edward McCarthy, P.E.

August 3, 1978

for the information you requested!!!

This is to be used in conjunction with
Sketch #105 which is also enclosed
Very truly yours

EDWARD R. DEPARTMENT

E.G. Deinstein A.C.E.

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Tunne Park Reservoir		Cantilever	
Gates Nos. #1, 2, 3, 4, 5, 6, 7		Showing Gates & Gate Plans	
#1		Super Structure Plans	16772X, 16773X
#6			16774X-16775X
#5		Pine Railway, Gate - Drawn	16781-X
#1, #2		Steel Doors for Valves	16782-X
#6		2-48" Main Section & Plan	16783-X
#7		Bog Plans	16784-X
#6			16785-X
#5			16786-X
#4			16787-X
#3			16788-X
#2			16789-X
#1			16790-X
#7			16791-X
#2, #3, #4		Gas Engine Power Generating Plans (Void)	
#2, #3, #4, #6, #7		Stairs & Railings for Valves	16792-X
#1		Super Structure Plans	16793X (void)
#1		Draining Service Gates	16794-X to 16795X
		Stop planks, Inquaduct	16796-X
Gate House #1, 2, 3, 4, 5, 6, 7		Small Scale Plans & Designs	
#1		Rail Plan at Elevation 186 ft + 147.9	1681 1682-X
#1		Plans & Sections	1683-X to 1684-X
#2		20' & 48' Drains & Drainage Syst.	1685X, 1686X
#2		Do	1687X to 1688X
#2		Blower	1689 1690X to 1691X
#2		Iron Work, Pipes, Ladders	1692-X to 1693-X
#2		SECTIONS & PLANS	1694X to 1695X
#3			1696X to 1697X
#4			1698X to 1699X
#5			1700X to 1701X
#6			1702X to 1703X
#7			1704X to 1705X
#2		Section or One & Half Hours	1706-X
		Overflow & Breezway Pipes	1707-X
		48" By Pass - Discharge Arms	1708-X
		Location on Gate Houses	1709-X
		Hinges for Steel Doors	1710-X
			1711-X
Outlet Chamber		Section or One & Half Hours	
Map		Overflow & Breezway Pipes	1712-X
Gate House No. 2		48" By Pass - Discharge Arms	1713-X
Lane Reservoir to S.F. Commiss.	East Basin	Location on Gate Houses	1714-X
Lane Reservoir	To Boxes or Transportation	Hinges for Steel Doors	1715-X
" " To S.F. Commiss for Armory			1716-X
See "Reservoir" - Boxes			1717-X
FILTERS		General Arrangement	1718-X
		Plans are	1719-X to 1720-X
		" "	1721-X to 1722-X
		" "	1723-X to 1724-X
		Bog's -	1725-X
Filter Box Water		Distribution from Res.	
Armory			1726-X
		Site Plan & Section	1727-X, 1728-X
		Pilot Plan	1729-X, 1730-X
		Survey of Site	1731-X, 1732-X
		Retaining Wall at Reservoir Site	1733-X
		Contract Drawings to Commiss. E. Basin No	1734-X to 1735-X
		General Plan	1736-X
		Topography Boxes Construction	1737-X
		Fence - East Side of East Basin	1738-X
Not Built	East Basin		
	" "		
	" "		
	" "		
	" "		

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Team Price Research

Contour Map ✓

General Map ✓

✓ ✓

Streets

Keeper's House ✓

Tantris Cottage ✓

Street Alignment Digs ✓

Cornwall " ✓

Borings ✓

Aqueduct Sections ✓

BREAST & DIVISION WALLS; ✓

Core Walls ✓

RETAINING WALLS ✓

WASTE WEIR ✓

CULVERTS ✓

POWDER HOUSE ✓

GATE HOUSE #7 ✓

" " #4 ✓

Watson Park Reservoir ✓

Fencing ✓

" "

Emergency Pumping Sta.

Pump Sta. STAAR #3 ✓

Keeper's House ✓

SECTION TOWER ✓

METER SETTING ✓

YARD LIGHTS ✓

EAST BASIN COVERINGS ✓

EAST BASIN ✓

STATION GATES ✓

GATE STANES ✓

STOOLE BLOCKS ✓

NORTH & SOUTH LIONESS ✓

GATE HOUSE #4 & #6 ✓

WALL OF RES. ✓

GATE HOUSE #5 ✓

Lining & Embankment ✓

RETAINING WALL ✓

SUPERSTRUCTURES ✓

CORE WALL SECTIONS ✓

EAST BASIN ✓

SETTING FORCA ✓

2-45' CURVE MAINS ✓

GATE HOUSE #1, 2, 3, 4, 5, 6, 7 ✓

PLANS, SECTIONS, DETAILS ✓

" " " " "

" " " " "

MAP ✓

GATE HOUSE #1 ✓

" " #5 ✓

Reservoir and Gate Houses ✓

Filters ✓

GATE HOUSE #4 ✓

Showing Pipe System

Plans ✓

4890 X, min. Cost Ash.

1900 4987 X, 70 4992 X

1995 4985 X, 70 4987 X

" 4986 X

1918 5076 X to 5081 X

" 5057 X to 5078 X

" 5061 X to 5066 X

1916 5034 X to 5040 X

1917 11 5030 X

1901 5025 X to 5029 X

1896 5018 X to 5024 X

1903 5015 X to 5017 X

1900 5007 X to 5014 X

1900 5008 X, 5009 X

" 5006 X

1904 5001 X to 5003 X

7/2 9942 X

9946 X

9428 X

Cost 15

PRELIMINARY STUDY

SECTIONS

scratches, displaced or rearranged, new

discrete 100 ft sections pipe

1912

North & South Ends of Res.

Painting

EAST SIDE OF EAST BASIN

Locality Plan

GATE HOUSE, TUNNEL

Moving & Repairing

11650 Y to 11656 Y

341 23848-X

6/06 9778-Y

3/06 9771-Y to 9778-Y

3/06 6038-X, 9771-Y

10/11 9531-Y to 9534-Y

7/18 9616-Y

9770-Y

10/10 2006-X, 2007-X

1910 2008-X

GATE HOUSE

Temporary Housing

For 48' Poles

Inlet Chambers

CONNECTIONS

SECTION (NOT WORTH)

Frame sheds at

1911 9518-Y

11/10 2006-X

10/10 2003-X

6/14 2195X, 2196X

1901 6034-X

1916 9273-Z

6/09 9710-Z

1/06 3204-X

11/2 4828X, 4848X

6/04 4844X, 4866X

6/04 4897X to 4820X

10/35 6038-X

11/3 25268-Y

1932 24156-X

23069-X to 23071-X

1917 9780-Y

1912 970-Y

11/18 11859-X

12/30 72743-X

Showing Terrain, Gate Houses, Etc.

Planned West Screen

Protection of 40' C. 10' W. 20' H.

at Golden Ave.

Plants & Sections

Gen. Arrangement

Pipe Conn.

Trains

<u>Park Res.</u>		
"Conduit lines from Rye Pond.		2415
Basin released to S.F. Comm.	1916	11298-
Red Soundings	1913	11,314-
Assignment to Park Dept.	1915	10669-X
Fencing-	1925	16257-X
Saddle Blocks - Concrete Forms	1905	9719-2
Stainless Steel & Lifting Machinery - Appar. Cases	1903 (Folder) (Form)	1107-
Overflow & B.O. Pipe Lines	" " Cast. Arms 1903 (Folder) (Form)	6146
G.H.M.G. - Marriage & B.O.	" " " 1903 (Folder) (Form)	6132
Overflow & B.O. Sewers, etc.	1879 (Folder) (Form)	6112
Keeper's House	1897 (Folder) (Form)	6126
Overflow & B.O. Pipe	1903 (Folder) (Form)	6112
Cock Valves & Special Castings	1903 (Folder) (Form)	601
Gatehouse #5, Superstructure over	May 1938	27174-Y to 2717
Gatehouse #7	" June 1938	27227-Y to 272
Gatehouse #3	" Jan 1938	27249-X to 272
Gatehouse #2	" Jan 1938	27246-X to 272
Gatehouse #5	Plumbing & Heating Work	May 1938
Gatehouse No. 5 Storage Room in Superstructure	Feb. 1940	28229-X
Overflow & Draining tanks, Water Heaters & Appa.		8482-X
Keeper's House. (Cont. Draw. (Folder Form))	6/22/1933	6169-X
MAP OF	1918 (Rolle)	6172-X
Grading, Fencing & Misc. Improvements	1940	28567-X, 28568-X
Alterations to G.H. #5-6-7 to House Chlorinating Equipment	1941	28137-X to 28252-X
Relocation of fence at G.H. #7	12/29/41	29293-X
Alterations to G.H. #5-6-7 to House Chlorinating Equipment	1942 (Record)	28151-X to 28252-X
Proposed Concrete Driveway or Gate House #7	Nov. 12, 42	29464-X
Steel Erection & Details G.H. 2, 5, 6, 7 <u>Inclusion of shop plants & Removal of stone gates and gateways</u>	12/18/42	-29493-X (REMOVED)
from Gate House No. 3 Jerome Park Reservoir	9/26/42	29447-Y ✓
Proposed concrete steps for Seeding 18' wide outside of G.H. #3 Jerome Park Reservoir	9/19/43	29580-Y ✓
Floating Scum Barrier - (including floating device and support)	7/22/43	29589-Y
Installation of Pans & Boxes in Gate Houses 2, 5, 6, 7	2/1/44	29732-X
G.H. #7 - Installation of Chlorine Equipment	1944	29756-X
Location of New & Old Cotton Products, Van Cortlandt Park		28147-X
G.H. #6 - Installation Layout of Chlorine Equipment	1945	29937-X
G.H. #5 - " " " (Shl. of 3) 1945		29938-X
G.H. #5 - Installation Layout of Chlorine Equipment (Shl. 2 of 3)	1945	29929-X
" " " " " (Shl. 3 of 3) 1945		29940-X
G.H. #2 - " " " " "	1944	29879-X
Proposed repairs to walls, " "	3/13/47	30681-2
" Wire Rope Railings bet. G.H. 5 & G. H. 6	12/17/47	31015-X
Prop. Stanchy, Chlor & Appar. G.H. #2, 5, 6, 7	4/57	32870-X
Jerome Pump. 812 - New Sheet Metal Work	5/64	39607-Z
F. 42 - " " " " "	7/67	41615-X
Micronitraining Screens at Gate House #6	1965	39810-X to 39933-X
" Screens at Gate House #6 - 1968 (Record Dated) 39810-X to 39933-X		
New Fire Hydrant #7 Jerome Rd.	3/67	40904-Y
Paving Driveway & Chain Link Fence	6/68	40925-X
Painting Gate House #5	4/68	41759-Y
New Electrical System G.H. #5	6/69	41626-X